



ISM-H5000  
LARGE DEPTH OF FIELD 3D MEASURING MICROSCOPE  
OPERATING INSTRUCTIONS

## 3D measuring microscope operating instructions

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## 3D measuring microscope operating instructions

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### Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 Danger	Indicates a hazardous situation which, if not avoided, will or could result in death or serious injury.
 Caution	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
 Note	Provides additional information to emphasize or supplement important points of the main text.

### Safety Instructions

Microscope is a precision optical instrument. To maintain its high-performance status, you must follow specific operating procedures and properly maintain and use it. Please strictly adhere to the following safety instruction. Otherwise, the device's protective functions may fail to operate normally.

- This device is not waterproof, explosion-proof, or radiation-resistant. Please do not use it in environments with drastic temperature changes, condensation, water, direct sunlight, potential explosions, or radiation exposure.
- Before use, please check whether the line voltage matches the voltage indicated on the device's nameplate. The power plug must have a grounding wire, and the grounding wire must be in good condition. When not in use for an extended period, please press the AC power-off button and remove the AC power cable from the socket.
- The weight of the sample must not exceed 5 kg. Otherwise, it may damage the main body of the microscope.
- Whether or not optical instruments are in use, do not look directly at the light source, nor expose your skin to the light directly, as this may harm your eyes or skin.



- For specifications exceeding the defined limits, unauthorized modifications, or combined use with other devices, the company cannot guarantee the functionality and performance of the device due to differing usage conditions or environments.
- In the event of the following situations, please immediately disconnect the power supply. Continuing to use the microscope under abnormal conditions may lead to fire, electric shock, malfunction or failure.
- When water or foreign objects enter the main body of the device.
- When the main body of the device emits smoke or an unusual odor.
- When the main body of the device is dropped or its package is damaged.

# Contents

Chapter 1 Device Introduction .....	1
1.1 Product Description.....	1
1.2 Function Features.....	2
1.3 Parameter Description .....	4
1.4 Product Appearance Introduction.....	7
1.5 Definition of Power Supply and I/O Interface .....	8
1.6 Indicator Description .....	9
1.7 Packing List (Factory Configuration).....	10
Chapter 2 Device Installation and Basic Usage .....	11
2.1 Device Cable .....	11
2.1.1 IPC Connection.....	11
2.1.2 Body Connection.....	11
2.1.3 Head Connection .....	11
2.2 Client Installation and IP Configuration.....	11
2.3 Startup Steps .....	12
2.4 Shutdown Steps.....	13
2.5 Main Window Description.....	13
2.5.1 Observation Window.....	13
2.5.2 Information Window .....	13
2.5.3 Quick Button .....	14
2.5.4 Control Panel .....	15
Chapter 3 Basic Configuration.....	16
3.1 Record and Save Static Image .....	16
3.2 Rec Settings .....	18
3.3 Focus View.....	20
3.4 Adjust Focus.....	20
3.4.1 Manual Adjustment .....	20
3.4.2 Auto Focus .....	21
3.5 Move XY Stage .....	22
3.6 Observation by Tilting Z-Axis .....	23
Chapter 4 Quick Start .....	25
4.1 Reproduce Rec Settings.....	26
4.2 2D Playback .....	27
4.3 Increase Image Quality.....	29
4.4 Quick 3D.....	30
Chapter 5 Lighting and Brightness .....	32
5.1 Lighting .....	32
5.2 Brightness .....	33
Chapter 6 2D .....	36
6.1 2D Display.....	36

## 3D measuring microscope operating instructions

---

6.1.1 Split Screen .....	36
6.1.2 Anti-Vibration Correction .....	38
6.1.3 Wide-View Display.....	40
6.1.4 Wheel Zoom.....	42
6.1.5 Comment .....	43
6.2 Increase Image Quality.....	46
6.2.1 Opt-SEM .....	46
6.2.2 Glare Removal.....	51
6.2.3 Enable Glare Removal.....	51
6.2.4 Ring Removal .....	53
6.2.5 HDR (High Dynamic Range).....	55
6.2.6 Resolution Enhancement.....	57
6.3 Record Video .....	59
6.4 Timer Record .....	61
Chapter 7 3D .....	63
7.1 Quick 3D.....	63
7.2 Fine Depth Composition.....	65
7.3 3D Playback .....	67
7.3.1 3D Playback Basic Settings.....	67
7.3.2 3D Scale.....	69
7.3.3 3D Comment .....	70
7.3.4 3D Playback Settings.....	70
7.4 Point Height Measurement.....	72
7.4.1 Open Point Height Measurement.....	72
7.4.2 Point Height Display Settings.....	74
7.5 Profile Measurement.....	74
7.5.1 Enable Profile Measurement.....	74
7.5.2 Profile Measurement Settings.....	75
7.6 Volume Measurement.....	83
7.6.1 Enable Volume Measurement.....	83
7.6.2 Volume Measurement Settings.....	84
7.7 Roughness Measurement.....	85
7.7.1 Enable Roughness Measurement.....	85
7.7.2 Roughness Measurement Settings.....	86
7.8 Lighting Simulation .....	90
7.8.1 Enable Virtual Lighting.....	90
7.8.2 Virtual Lighting Settings.....	91
Chapter 8 Stitching .....	93
8.1 2D Image Stitching.....	93
8.1.1 Center of FOV Stitching.....	94
8.1.2 End Point Stitching.....	95
8.1.3 XY Length .....	96
8.2 3D Image Stitching.....	97
8.2.1 Center of FOV Stitching.....	97
8.2.2 End Point Stitching.....	98

## 3D measuring microscope operating instructions

---

8.2.3 XY Length .....	99
8.3 Register Stage Position .....	100
Chapter 9 Measurement .....	102
9.1 Plane Measurement .....	102
9.1.1 Type Overview .....	102
9.1.2 Main Measurement .....	105
9.1.3 Measuring Area .....	116
9.1.4 Unit and Number of Decimal Places .....	123
9.2 Scale .....	124
9.3 Grain Counting .....	126
9.3.1 Measurement Steps .....	126
9.3.2 Unit and Decimal Places .....	143
Chapter 10 Album .....	144
10.1 Album .....	144
10.1.1 File Format .....	145
10.1.2 Folder Operation .....	146
10.1.3 File Operation .....	146
10.2 Side Album .....	147
Chapter 11 Navigation .....	149
11.1 Register Low Mag. Image .....	149
11.2 Register Stitched Image .....	150
Chapter 12 Settings .....	152
12.1 Rec Settings .....	152
12.2 Image Settings .....	153
12.3 General Settings .....	154
12.4 System Settings .....	156
12.4.1 Vision Correction .....	156
12.4.2 Objective Lens Installation .....	157
12.4.3 Version Information .....	157

# Chapter 1 Device Introduction

## 1.1 Product Description

The ISM-H5000 system consists of six main components: optical microscope system, image processing system, motion control system, mechanical system, planning control system, and display system. It consists of computer software, image collection and processing technique, automation control technique, AI algorithm technique, and it consists of five types of technologies: optical, mechanical, electrical, computing, and software. It can be used for observing, measuring, and analyzing micro-surface features.

ISM-H5000 unlike conventional microscope, provides 2D and 3D observation, including stitching, measuring, improving image quality, auto focus, saving, higher magnification, greater depth, fuller observing angle, more powerful image processing, more accurate size measurement, smarter instrument operation, and it can be used in new energy, 3C electronics, automotive industry, photovoltaic, new material, intelligent manufacturing, medical and pharmaceutical, customs, scientific research institute and other industries.



## 1.2 Function Features

Microscope Function Parameters	
2D Basic Observation	Yes
Auto Focus	Yes
Manual Focus	Yes
Focus View	Yes
Lighting Switch	Yes
2D Tilt Observation	Yes
Split Screen	Yes, vertical split, horizontal split, quarter split, and 9-way split (check if the screen is linked when the screen is split)
Wide-View Display	Yes
Real-Time Digital Zooming	Yes, 1 to 10 times
Comment Display	Yes
Glare Removal	Yes. Brightness between 0 and 100
Ring Removal	Yes. Weak, normal, and strong adjustable
HDR	Yes. Brightness/texture/contrast/color 0 to 100 adjustable
Opt-SEM	Yes
Resolution Enhancement	Yes
Anti-Vibration Correction	Yes
2D Stitching	Yes, up to 5 billion pixels can be spliced
3D Stitching	Yes, up to 2.5 billion pixels, 50000 × 50000 pixels allowed
Quick 3D Composition	Yes
Fine Depth Composition	Yes
3D Display	Yes

## 3D measuring microscope operating instructions

---

Microscope Function Parameters	
Record and Save Image and Video	Yes
Output Report (Excel)	Yes
Reproduce Record Condition	Yes
Timer Record	Yes
Video Playback	Yes
2D Measurement- Distance/Angle/Radius/Area Measurement	Yes
2D Measurement- Edge Detection	Yes
Scale Display	Yes
Auto Area Measurement	Yes, length and area can be measured by extracting brightness/color
3D Profile Measurement	Yes
Roughness Measurement	Yes
Easy Mode Function	Yes

## 1.3 Parameter Description

Module Parameters	
Objective lens	4 objective lens
Console	Optional, USB 2.0 interface, 1 by default
Microscope Body	
Magnification	30X to 6000X
Horizontal Resolution	0.42 um (over 2000x)
Observation Distance	Max. 30 mm, min. 2 mm
Max. Sample Height	88 mm
Max. Depth	30 mm
Illumination	Full coaxial, patial coaxial, full ring, patial ring, mix, and transmitted illumination
Light Source Life	LED light source, ideal life expectancy: 40000 h
Objective Lens Switch Mode	Electric
Zoom Mode	Electric
Max. Observable Image Size	5 billion pixels
Tilt Observation Angle	-89 ° to 89 °

## 3D measuring microscope operating instructions

Camera Parameters	
CMOS Sensor	1/1.7", 12.22 MP (4168 × 3062)
Scan Method	Progressive scan
Frame Rate	30 frames
Resolution	Fast mode: 2048 × 1536 Standard mode: 2880 × 2160 High resolution mode: 4000 × 3000
White Balance	Manual, Preset
Gain	Manual, Preset
Display Parameters	
Size	27 inches
Image Size	596.736 mm × 335.664 mm
Pixel Size	0.1554 mm × 0.1554 mm
Number of Pixels	3840 × 2160
Display Color	Approx. 1.07 billion
XYθ Motion Platform Parameters	
Electric/Manual	Electric
Motor	2-phase steppmotor
Resolution	1 μm
Moving Speed	10 mm/s
Moving Distance	± 20 mm
<b>θ Rotated Angle</b>	-90 °C to 90 °C
Platform Size	170 mm × 170 mm
Load	5 kg
Up Z-Axis	
Electric/Manual	Electric
Motor	5-phase steppmotor
Resolution	0.1 μm
Moving Speed	16.5 mm/s

## 3D measuring microscope operating instructions

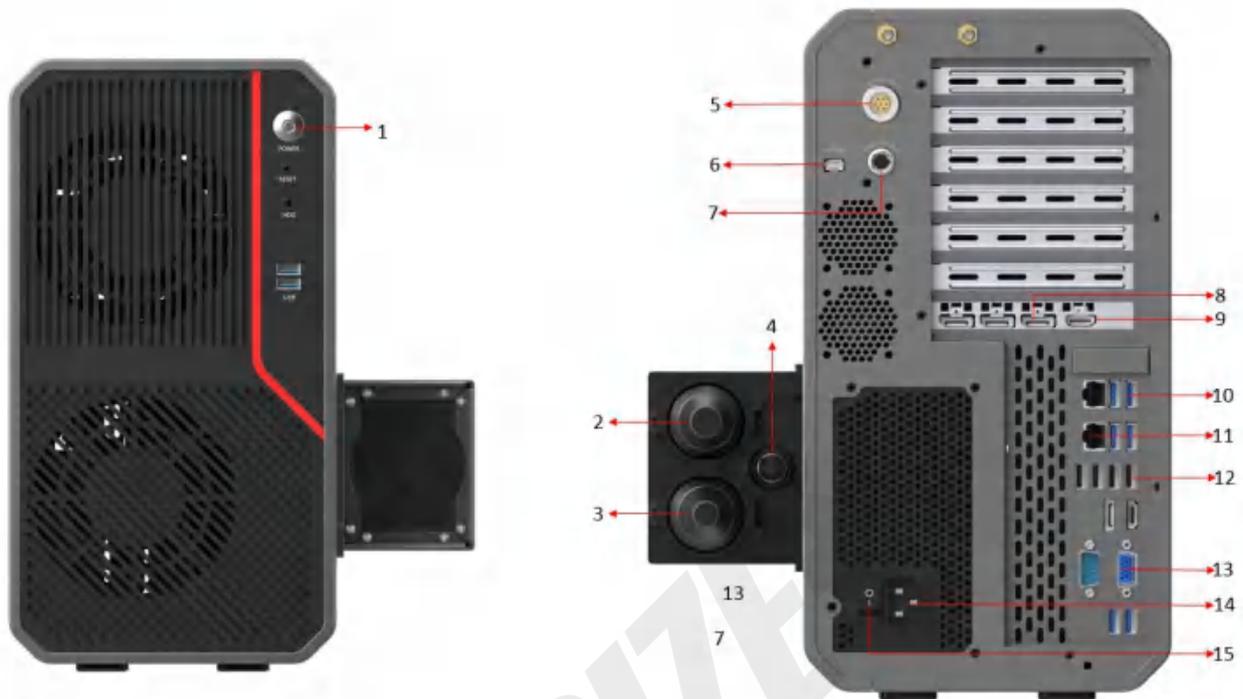
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Moving Distance	50 mm
Down Z-Axis	
Electric/Manual	Electric
Motor	2-phase stepmotor
Resolution	1 $\mu$ m
Moving Speed	10 mm/s
Moving Distance	50 mm
Environment Requirements	
Working Temperature	5 °C to 40 °C
Working Humidity	20 to 80%RH (no condensing)
Storage Temperature	5 °C to 40 °C
Storage Humidity	20 to 80%RH (no condensing)
Other	
Weight	70 kg
Dimensions	323 mm × 710 mm × 597 mm
Power Supply	220 V
Power Consumption	Whole device < 700 W

## 1.4 Product Appearance Introduction



### 1.5 Definition of Power Supply and I/O Interface



Definition of Power Supply and I/O Interface

- **1=Power Switch (POWER) Button**  
Start the IPC or force shut down. Before changing installation site or removing the camera, make sure the power button is not lit.
- **2=Ring Illumination Fiber Port**  
When connecting to this port, the ring illumination optical fiber (8 LEDs) of head can get the illumination normally.
- **3=Coaxial Illumination Fiber Port**  
When connecting to this port, the coaxial illumination optical fiber (5 LEDs) of head can get the illumination normally.
- **4=Lamp Chamber Communication Port**
- **5=Lamp Chamber Connection Port**  
The connection port of the bidirectional cable for the IPC's side lamp chamber illumination.
- **6=Head Connection Port**  
Port of the signal cable connected to the head.
- **7=Body Connection Port**  
Port of the signal cable connected to the body stage.
- **8=DP Signal Port**  
Support external display and project of DP output.

## 3D measuring microscope operating instructions

- **9=HDMI Signal Port**  
Support external display and project of HDMI output.
- **10=USB 3.0 Port**  
Connect USB devices and USB memory requiring high-speed data transferring for the body camera.
- **11=LAN Port**  
Connect the device to the LAN cable.
- **12=USB 2.0 Port**  
Connect USB devices such as keyboard and mouse, and USB memory.
- **13=VGA Signal Port**  
Support external display and project of VGV output.
- **14=AC Power Socket**  
Connect AC power cord (220 VAC, 50/60 Hz).
- **15=Main Power Switch of IPC**  
It is the main power switch of the IPC. After plugging in the three-phase power cord, the switch is placed in 1 position, meaning the power supply to the IPC. When the switch is placed in 0 position, meaning the IPC is not powered.

### 1.6 Indicator Description



Indicator Description

## 1.7 Packing List (Factory Configuration)

No.	Name	Quantity
1	Body	1
2	Head	1
3	XY Stage	1
4	Objective lens	4
5	Stage Plate	1
6	IPC	1
7	27-inch Display	1
8	Keyboard and Mouse	1
9	Console	1
10	Lamp Chamber	1
11	Dongle	1
12	220V Power Supply cable	3
13	Head Cable	1
14	Body Cable	1
15	HDMI Cable	1
16	Lamp Chamber Cable	1
17	Up Z-Axis Cable	1
18	Screw Package	1

## Chapter 2 Device Installation and Basic Usage

- When installing the device, the device should be installed in a stable and horizontal place. Otherwise, the device may reverse and cause damage.
- **Before connecting or removing the power supply cable, please** turn off the power switch of IPC and device body. Connecting or disconnecting the device in the power-on status may cause malfunction or failure.

### 2.1 Device Cable

#### 2.1.1 IPC Connection

- Use lamp chamber cable to connect the IPC and the lamp chamber.
- Use display cable to connect the IPC and the display. DP and HDMI interfaces are supported.
- Use body cable to connect the IPC and body.
- Use head cable to connect the IPC and head.
- Use camera cable to connect the IPC and camera. **USB should be inserted into the USB 3.0 interface (blue). Otherwise, video stream window will stutter. Note: Insert the USB 3.0 interface (blue).**
- Use USB interface to connect the IPC and dongle/console. USB 2.0/3.0 interface is supported.

#### 2.1.2 Body Connection

- Use focus Z-axis cable to connect the device body and head.
- The rated frequency of the device body's power supply cable is 50 to 60 Hz, voltage is 220 V and 110 V, **current is 2.3 A**. Switch is provided on device body.

#### 2.1.3 Head Connection

Use coaxial fiber and ring fiber to connect head and lamp chamber.

### 2.2 Client Installation and IP Configuration

The 3D OM.exe client software is preinstalled in the IPC. You need to plug in dongle to open client software normally. Otherwise, the pop-up window will be displayed.



Error Occurred When Opening Client Software without Dongle

The built-in network port of the IPC is used for side view communication. It is configured by default, do not change.



Side View IP Configuration (Factory Configuration)

## 2.3 Startup Steps

### Steps

1. Turn on power switch (1 position) of the device body after the device is wired and connected.
2. Turn on power switch of the IPC rear panel, and press the Power Switch (POWER) Button of the IPC front panel, and the IPC will start.

Note: By default, the account of IPC is admin, and its password is 123456.

3. Double-click 3D OM.exe on the desktop after the XY stage and Z-axis is moved to zero position.
4. Startup is completed.

### 2.4 Shutdown Steps

Steps

1. Close 3D OM.exe software, and shut down the IPC.
2. Turn off power switch of the IPC rear panel.
3. Turn off power switch (0 position) of the device body.
4. Shutdown is completed.

### 2.5 Main Window Description



Main Window of 3D OM Software

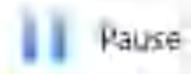
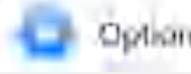
#### 2.5.1 Observation Window

The observation window displays the images recorded by the camera.

#### 2.5.2 Information Window

The information window displays magnification, rotation angle, tilt angle, X-axis, Y-axis, up Z-axis, down Z-axis, vision information, etc. When the mouse cursor hovers over the observation window, you can switch the magnification of objective lens in use (please note the distance between the sample and the lens before switching, and avoid knocking into the sample or lens).

### 2.5.3 Quick Button

QUICK BUTTON ITEM	FUNCTION
	Pause display in the observation window
	<b>Record</b> and save the displayed image in the observation window
	Include record settings, image settings, general settings, and system settings
	Close 3D OM software
	Z-axis rises, and focus Z-axis moves to the highest point
	<b>Auto focus</b>
	Move up in coarse increments
	Move down in coarse increments
	Move up in fine increments
	Move down in fine increments

## 2.5.4 Control Panel

CONTROL PANEL ITEM	FUNCTION
 <b>Easy Mode</b>	<p>You can quickly open frequently used functions. It is used for quick observation, record, and measurement.</p>
 Lighting/ Brightness	<p>When the image is bright (dark), the color is not suitable, and the action of the observation object is quick, please adjust the lighting/brightness.</p>
 2D	<p>You can set the image display method (split screen, zooming), or exactly restore the fine status of the object that is usually difficult to observe.</p>
 3D	<p>You can use multiple images with different focus to generate the focus part. 3D image can be created by compositing image.</p>
 Stitching	<p>By stitching together multiple images of larger observation objects that cannot be fully displayed within the usual record range, you can observe a more detailed image.</p>
 Measure	<p>Measure the distance, area, angle, etc. of the observation object.</p>
 Album	<p>The thumbnail displays, confirms and manages the saved images. Double-click the thumbnail to display and play.</p>
 Navigation	<p>You can register images with a large field of view as navigation. When executing high-magnification observation, you can get a visual picture of which part of the image is being viewed, and you can improve the observation efficiency.</p>

## Chapter 3 Basic Configuration

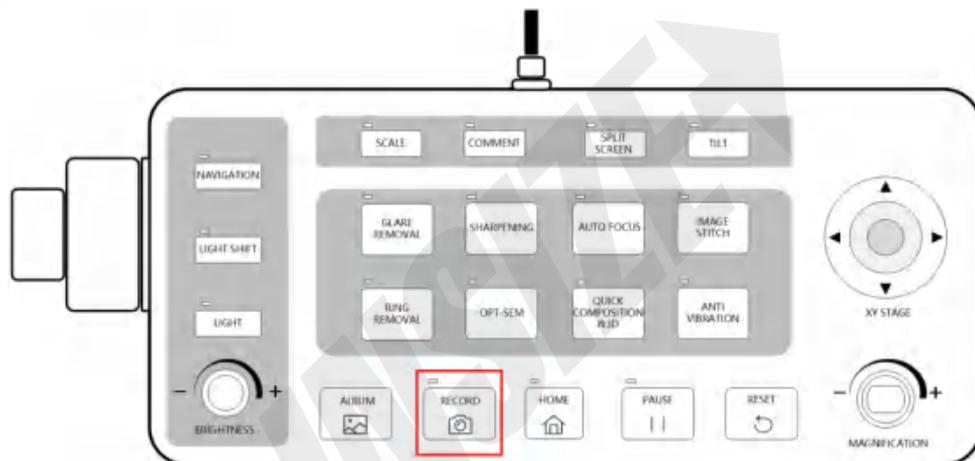
### 3.1 Record and Save Static Image

There are 2 methods to record and save static images: one is to use the record button on the console, the other is to use the Rec button of 3D OM.

Operation on Console:

Steps

1. Press the RECORD button on the Console.
2. Select the folder to save the image, and enter the file name.
3. Click Save.



Console Operation Map

Operation on 3D OM Software:

Steps

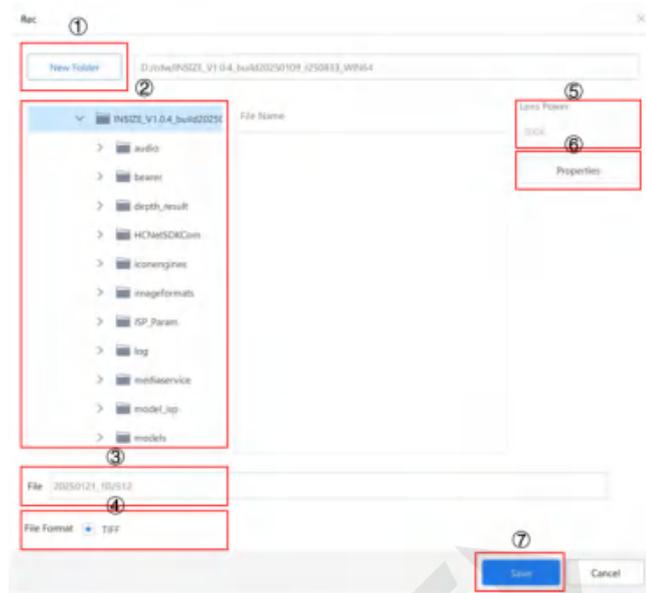
1. Click the [Rec].



Rec

2. Select the folder to save the image, and enter the file name.
3. Click Save.

### Record Window



Record Window

NO.	NAME	FUNCTION
1	<b>New Folder</b>	Create a new folder under the selected path.
2	Folder List	<b>Display HDD and folder. Click to select the folder to save.</b>
3	<b>File Name</b>	Enter file name.
4	File Format	Only TIFF image format is supported when saving.
5	Lens Power	Show the lens magnification of the captured and saved image.
6	Properties	<b>Add description to the image file.</b>
7	Save	Execute and save.

The configuration information will be saved to the image file after setting. Set file properties as needed.



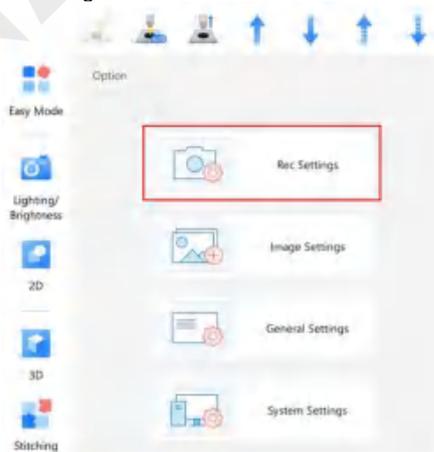
File Properties

## 3.2 Rec Settings

Select the image resolution and save automatically.

Steps

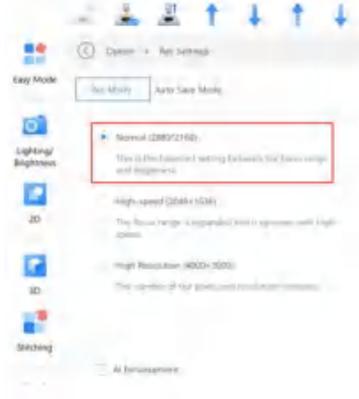
1. Click the [Option], and click [Rec Settings]



Rec Settings

## 3D measuring microscope operating instructions

2. Select [Rec Mode] to set the normal, high-speed, and high resolution modes.



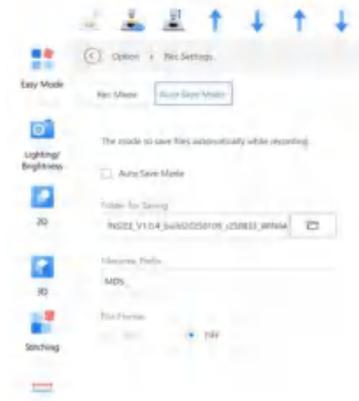
Select **Rec Mode**

3. When there is a higher requirement for resolution, you can enable the function of AI enhancement, and video stream frame rate will not decrease.



**AI Enhancement**

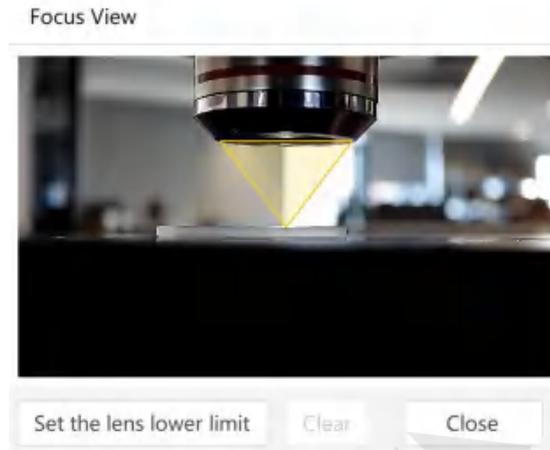
4. Enter [Auto Save Mode] to enable auto save mode, and set the folder for saving and filename prefix.



**Auto Save Mode**

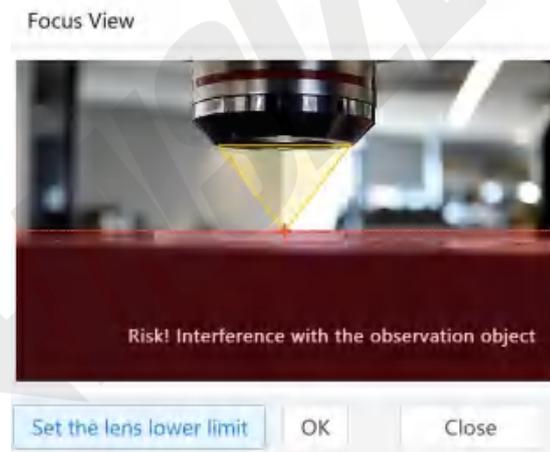
### 3.3 Focus View

When the up z-axis is moved, the focus view dialog will be displayed on the screen to visualize the distance between the optical system focus plane and the sample.



- **Set Lens Lower Limit:**

Click [Set the lens lower limit] to display the lens lower limit line on the focus view. Auto focus cannot be searched below the lower limit to avoid objective lens contact or collision with the sample.



- **Focus View Auto Focus:**

Double-click on the focus view, and the device will execute auto focus by referring the cursor height.

### 3.4 Adjust Focus

The methods of adjusting focus are divided into two types: manual adjustment and auto focus.

#### 3.4.1 Manual Adjustment

- **Operation on software:**

## 3D measuring microscope operating instructions

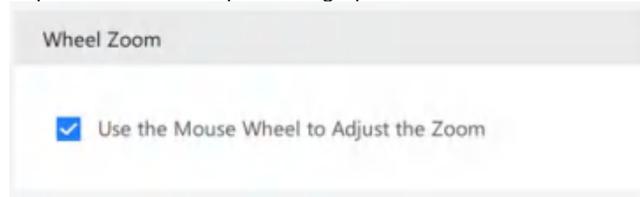
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The left side is the coarse step button, and the right side is the fine step button. After clicking the up Z-axis button at the top of the software interface, the up Z-axis inches based on coarse or fine step at the corresponding speed.



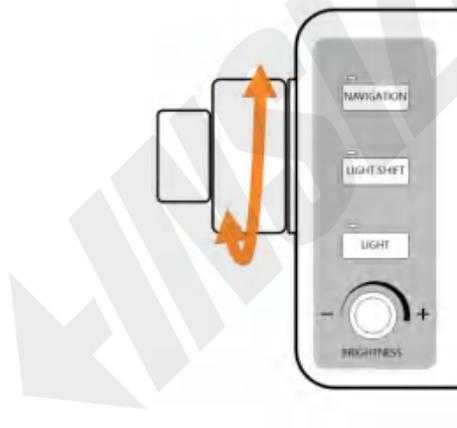
- **Mouse Wheel Operation:**

When the wheel zoom function is not selected, rotate the mouse wheel to let the up Z-axis inch based on coarse or fine step at the corresponding speed.



- **Console Adjustment Operation:**

Turn the large/small focus knob on the Console to let the up Z-axis inch based on coarse or fine step at the corresponding speed.



- **Up Z-Axis Rising Operation:**

Click the Z-axis rising button at the top of the software interface to rise up Z-axis to the highest position at a fixed rate.



### 3.4.2 Auto Focus

- **Operation on Software:**

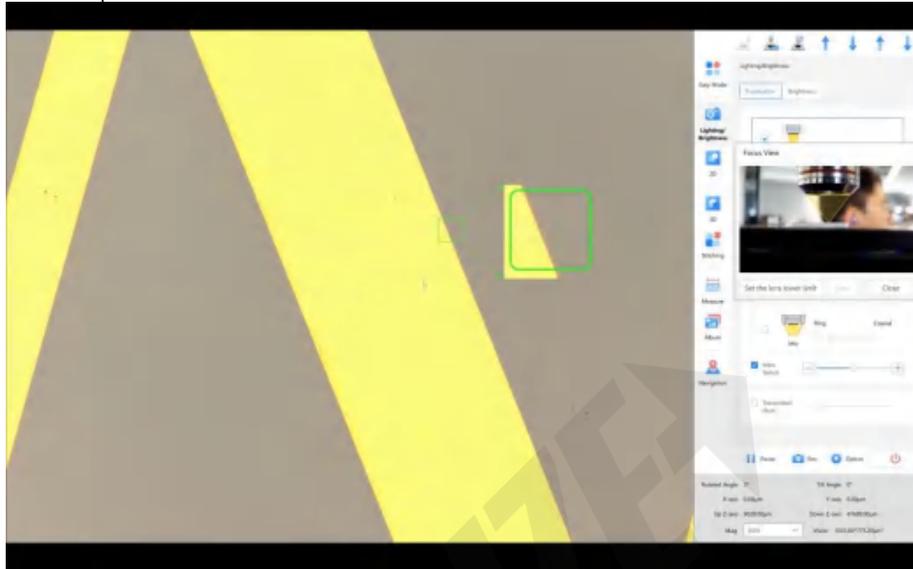
Click the auto focus button at the top of the software interface to execute auto focus with video stream center as reference position.

## 3D measuring microscope operating instructions



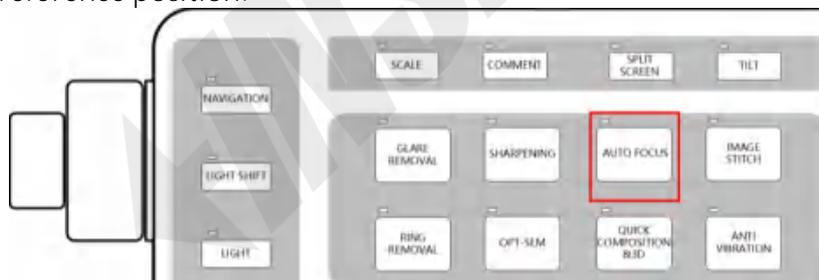
### ● Operation on Video Stream:

Double-click anywhere in the video stream, and the device will execute auto focus with double-click position as reference position.



### ● Console Operation:

Press the AUTO FOCUS button on the console, and the device will perform auto focus with video stream center as reference position.



## 3.5 Move XY Stage

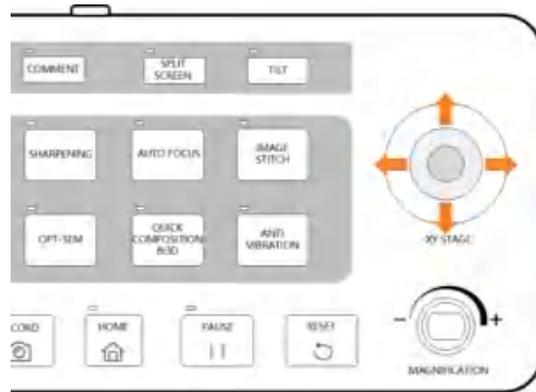
There are two ways to move XY stage:

- Use the **joystick** of the console to move the stage.
- Move the stage with the mouse.

Operation on Console:

Steps

1. Move the joystick in the same direction as that of the video stream.



Operation on 3D OM Software:

Under video stream conditions, click the left mouse button and drag the video stream area window to move the display in the direction of dragging.

Note: Dragging video stream is not allowed in functions such as measurement.

### 3.6 Observation by Tilting Z-Axis

Steps

1. Focus the sample in the position you want to tilt.
2. Unlock zero position lock by loosening it upwards.



3. Press the tilt console unlock button to tilt the head to the angle you want to view.

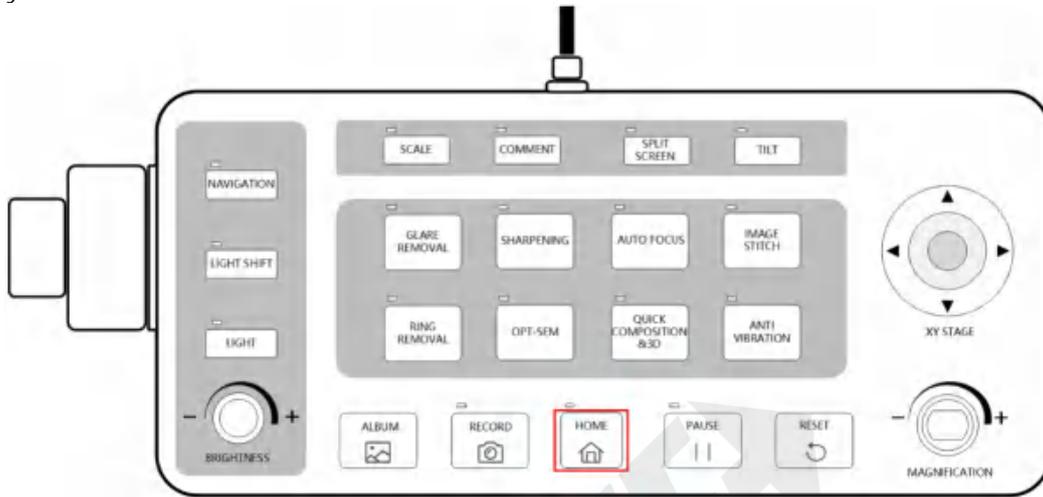


3. Release the tilt console unlock button and magnet brake will lock device head automatically.
4. The software interface displays the current tilt angle, as shown below.



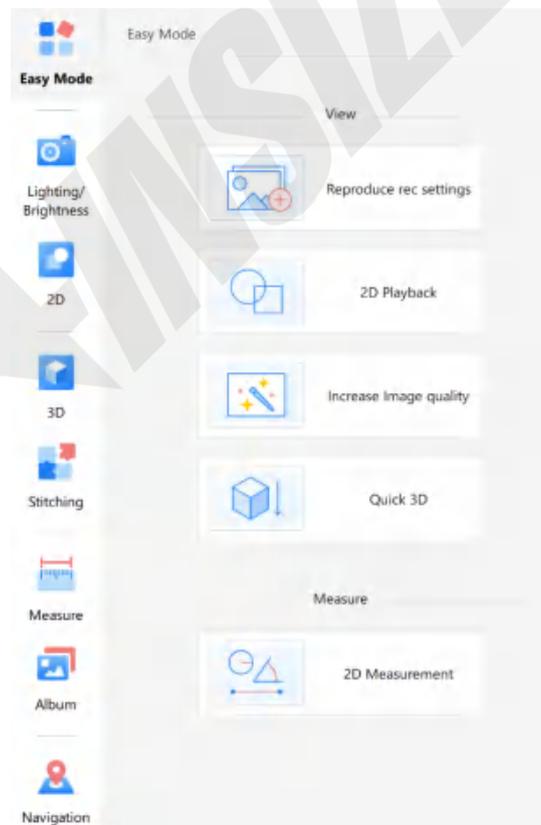
## Chapter 4 Quick Start

Please press home button on the console or click easy mode on software, you can quickly open frequently used functions.



Home Button

Easy mode:



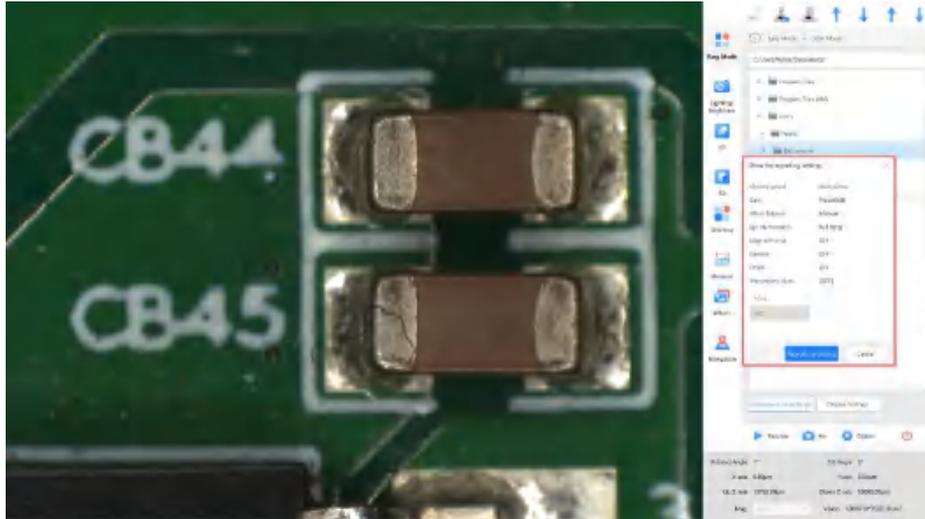
Easy Mode

## 4.1 Reproduce Rec Settings



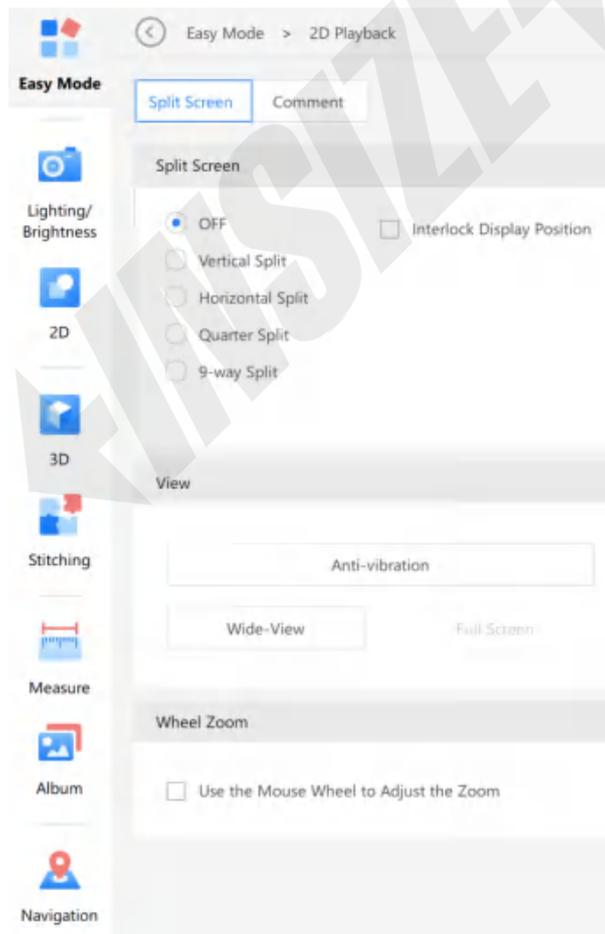
Selected Picture as **Reproduced** Picture

After clicking the picture, the selected picture will be reappeared and adjusted to this parameter automatically by clicking Reproduce Settings or Reproduce Rec Settings, including settings of lighting mode, exposure mode, gain, and white balance.



Reproduced Picture Details

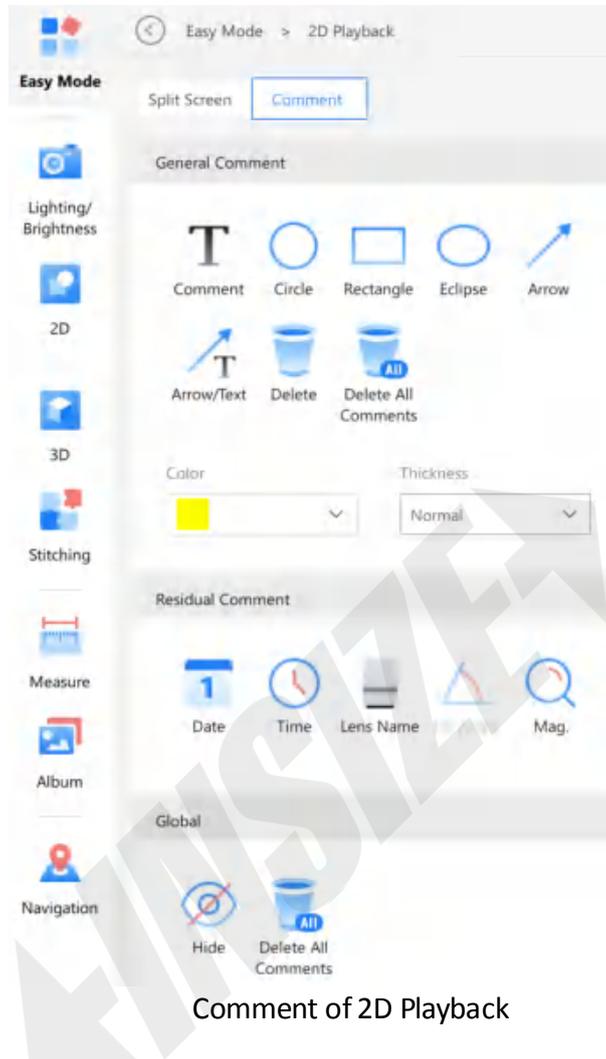
## 4.2 2D Playback



Split Screen of 2D Playback

## 3D measuring microscope operating instructions

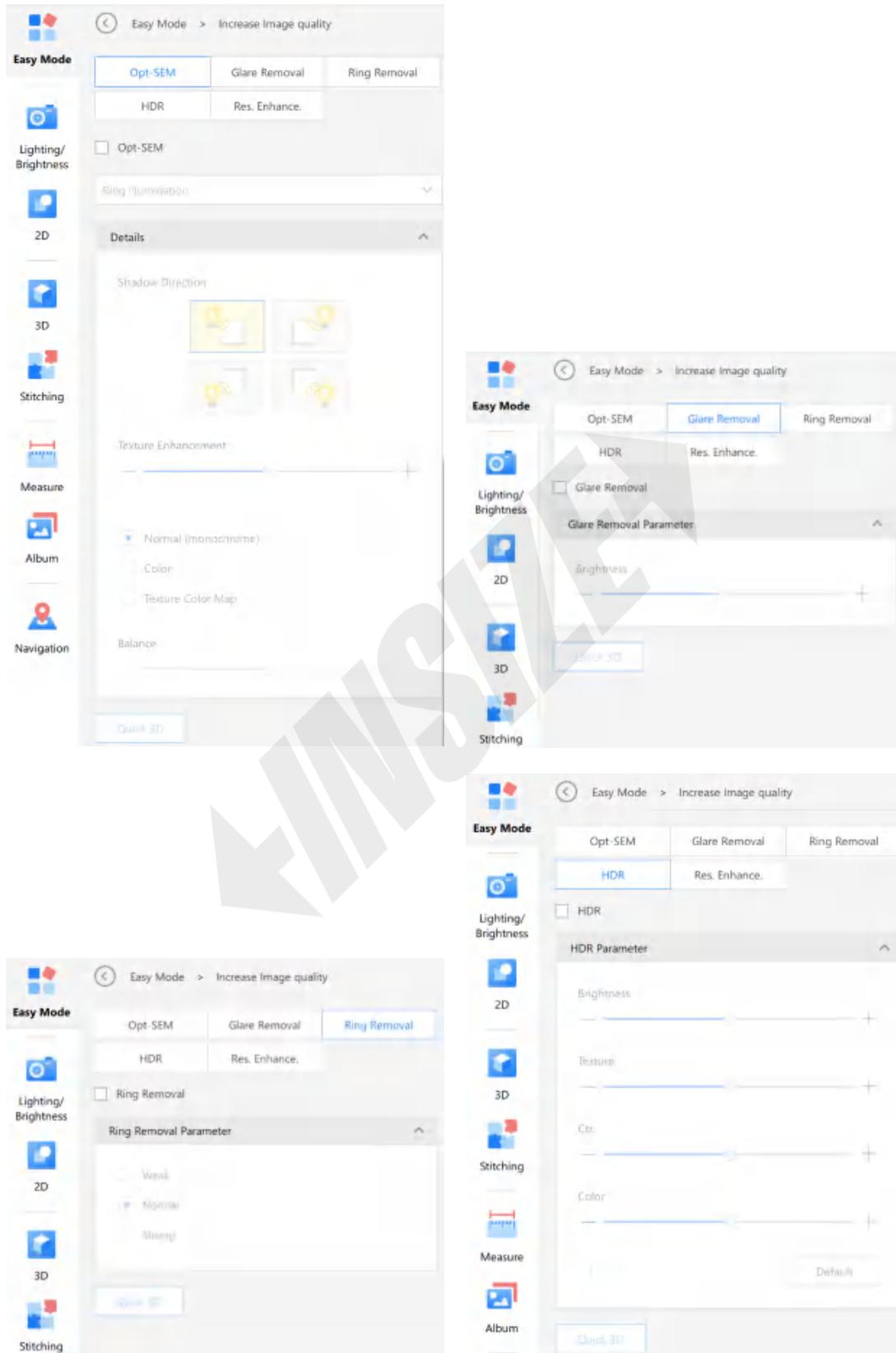
The split screen function supports different modes like vertical split, horizontal split, quarter split, etc. The same time, anti-vibration and wide-view function are also supported. See charter 2D for details.

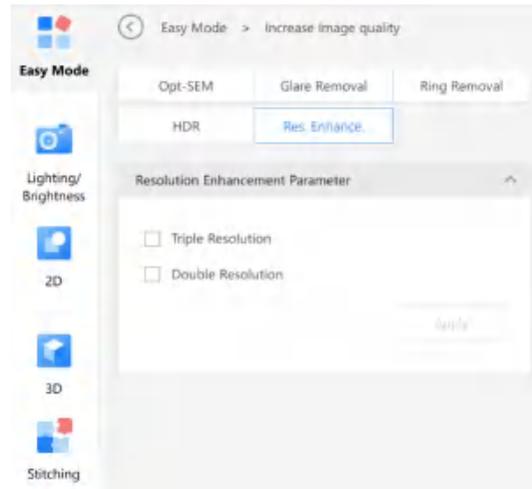


Comment of 2D Playback

The function of comment supports general comment, residual comment, and global comment. See charter 2D for details.

### 4.3 Increase Image Quality

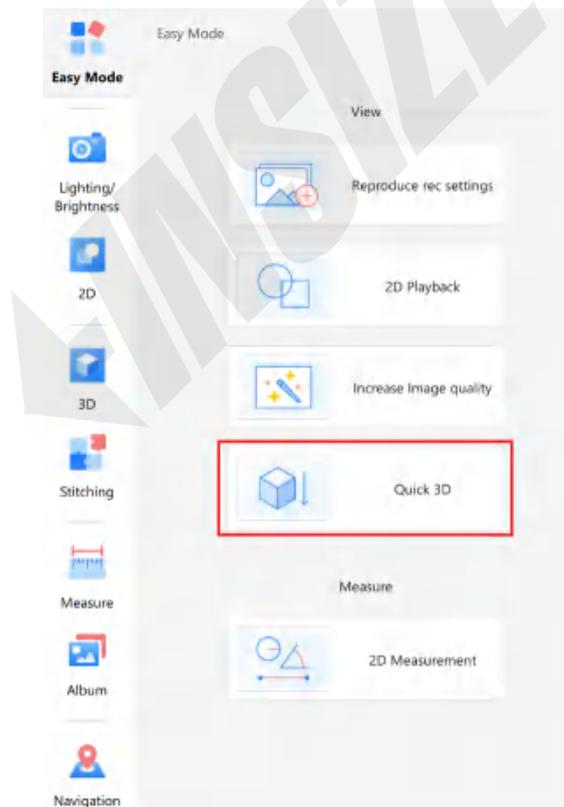




Increase Image Quality

The increase image quality includes opt-sem, glare removal, ring removal, HDR, and resolution enhancement functions.

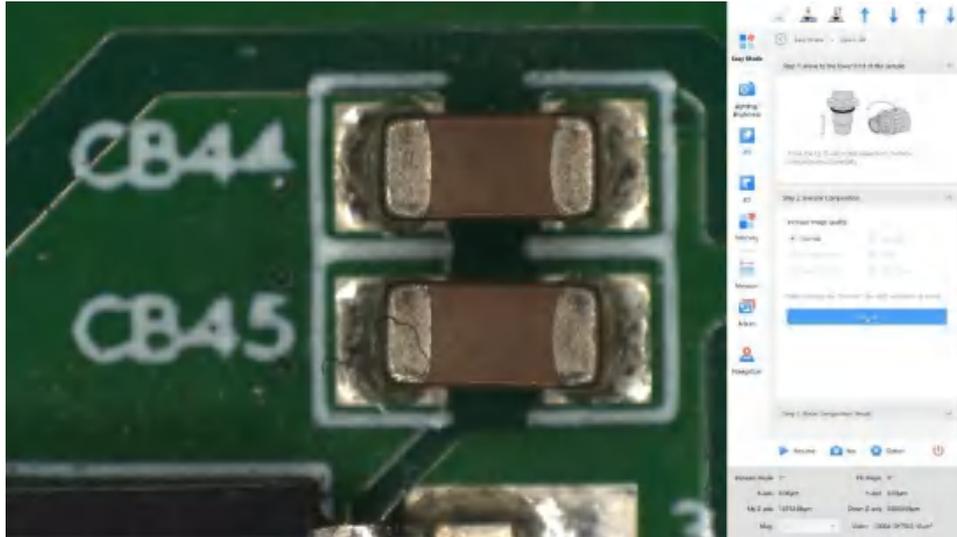
### 4.4 Quick 3D



Quick 3D

The quick 3D function can achieve 3D composition. See charter Quick 3D for details.

# 3D measuring microscope operating instructions



← IN SIZE →

## Chapter 5 Lighting and Brightness

You can adjust parameters of lighting and brightness in the [Lighting/Brightness] window.

### 5.1 Lighting

Changing the lighting mode can change the direction of lighting, and the texture of the sample to be viewed will become more obvious.

There are two ways to set the lighting mode. One mode is set via software and the other is set via console.

Steps

1. Click [Lighting/Brightness] to enter the page and select [Illumination].

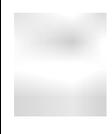
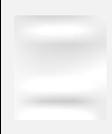


2. Select the main switch.

3. Click specific illumination mode.

After the illumination mode is selected, the icon should be marked with blue mark, and the frame should be marked with blue. The illumination modes are described below.

## 3D measuring microscope operating instructions

ILLUMINATION	FUNCTION
	Full coaxial. In this mode, you can view the samples in full coaxial.
	Partial coaxial. This mode can highlight the texture in partial coaxial. 4 light directions are allowed.
	Full ring. In this mode, you can view the samples in full ring.
	Partial ring. This mode can highlight the texture in partial ring. 4 light directions are allowed.
	Mix. It means the mixing of coaxial and ring, and you can use progress bar to adjust the mixing ratio of coaxial and ring

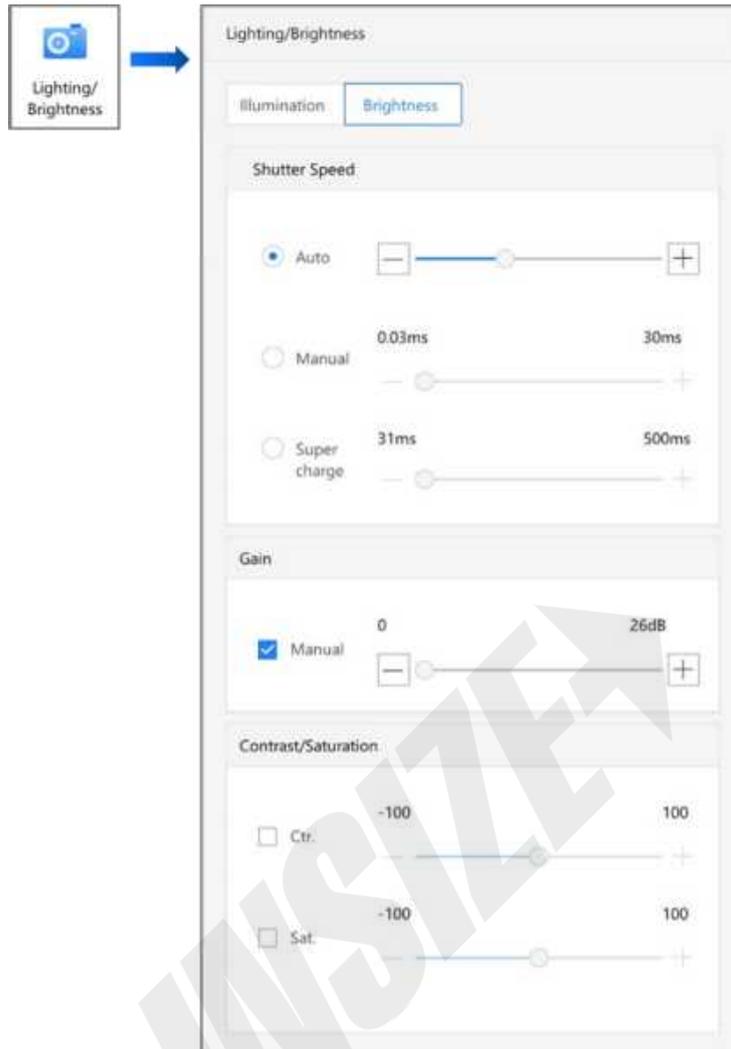
ILLUMINATION	FUNCTION
	Transmitted illumination. You can view the samples in the bottom light. You can use the progress bar to adjust the brightness of the transmitted light.

## 5.2 Brightness

Brightness is used to adjust brightness parameters, including shutter speed, gain, and contrast/saturation.

Steps

1. Click [Lighting/Brightness] to enter the lighting/brightness page, and select [Brightness].



2. Set brightness parameters.

### 3D measuring microscope operating instructions

ITEM	FUNCTION
Auto of Shutter Speed	<b>Adjust shutter speed automatically according to the</b> configured brightness. The configured brightness is changed by the progress bar.
Manual of Shutter Speed	<b>Adjust shutter speed manually.</b> The shutter speed is changed by the progress bar. The range is from 0.03 ms to 30 ms.
Super Charge of Shutter Speed	<b>Adjust shutter speed manually to observe low brightness samples.</b> <b>Note: Auto focus, quick 3D, etc.</b> will be affected when the super charge is enabled. The shutter speed is changed by the progress bar from 31 ms to 500 ms.
Manual Gain	Manually change gain value. The manual gain is changed by the progress bar from <b>0dB to 26dB</b> . When manual is not selected, the gain is disabled. The gain value is 0 dB.
Contrast	<b>Adjust image contrast.</b> The contrast is changed by the progress bar from -100 to 100. When contrast is not selected, the contrast adjustment is disabled. The contrast value is 0.
Saturation	<b>Adjust image saturation.</b> The saturation is changed by the progress bar from -100 and 100. When saturation is not selected, the saturation adjustment is disabled. The saturation value is 0.

## Chapter 6 2D

### 6.1 2D Display

#### 6.1.1 Split Screen

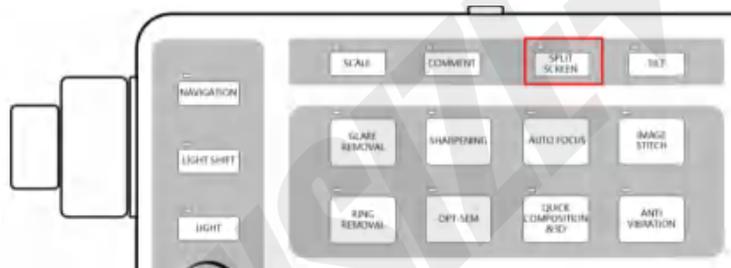
##### Function

You can use split screen to view the sample area, and compare the whole image with the enlarged image. You can also compare the image in the album with the real-time video stream. Note that only one screen in the split screen is real-time video stream.

##### Enable Split Screen

Enable split screen function on the console or 3D OM software.

- Operation on Console: Press the **SPLIT SCREEN** button on the console.

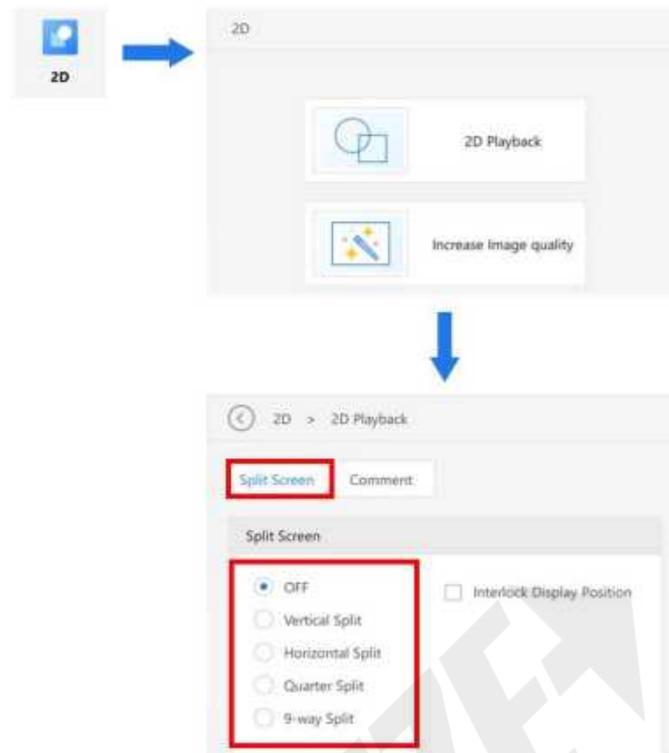


- Operation on 3D OM Software:

##### Steps

1. Click [2D].
2. Click [2D Playback].
3. Click the Split Screen tab.
4. Select the split method.

## 3D measuring microscope operating instructions

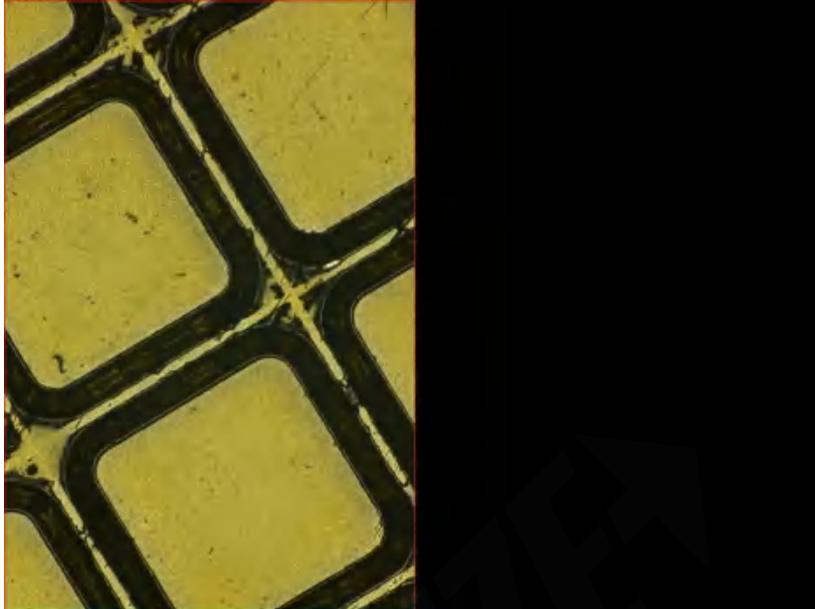


### Set Split Screen

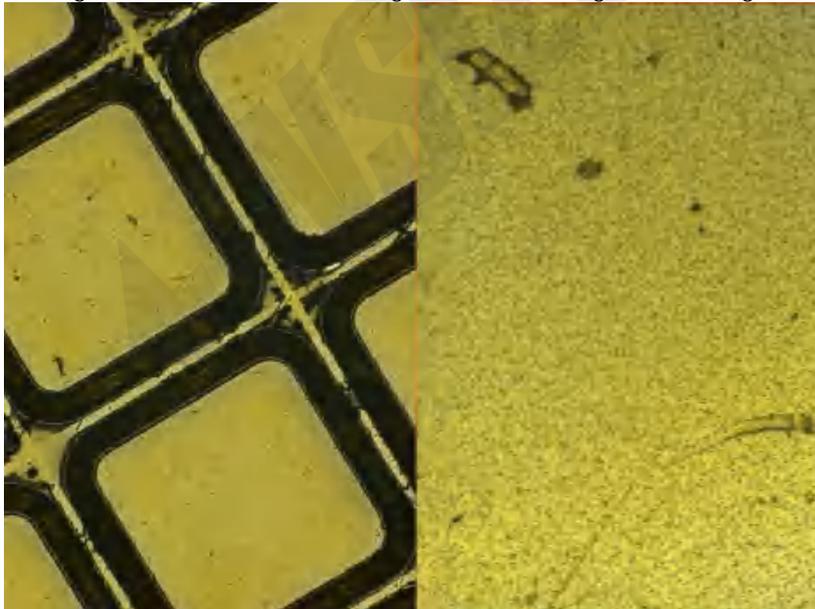
ITEM	FUNCTION
OFF	Stop split screen display.
Vertical Split	Split the image into left and right parts, and display 50% of the middle of the image respectively.
Horizontal Split	Split the image into upper and lower parts, and display 50% of the middle of the image respectively.
Quarter Split	Split the image into four parts, and reduce the image to 1/4.
9-Way Split	Split the image into nine parts, and reduce the image to 1/9.
Interlock Display Position	Use mouse wheel to zoom in and out and drag the mouse to apply to all the split-screen image.

- Split Screen Operation:

Take the vertical split as an example. When selected, the image is divided into two parts: The left part displays the center part of the original image, and split object being operated is marked with red box.



Click to change the image on the left to still image, and the image on the right to video stream.



You can press Play/Pause to get the image back to real-time video stream, or open the saved image in the album.

### 6.1.2 Anti-Vibration Correction

#### Function

Correct the anti-vibration of high power observation, so that the video stream image's vibration level will be lowered for users.

## 3D measuring microscope operating instructions



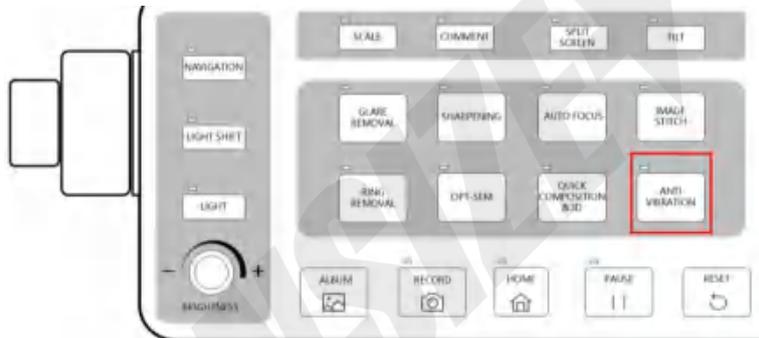
PCB (Original Image)

PCB (Anti-vibration Correction)

### Enable Anti Vibration

Enable the anti-vibration function on the console or 3D OM software.

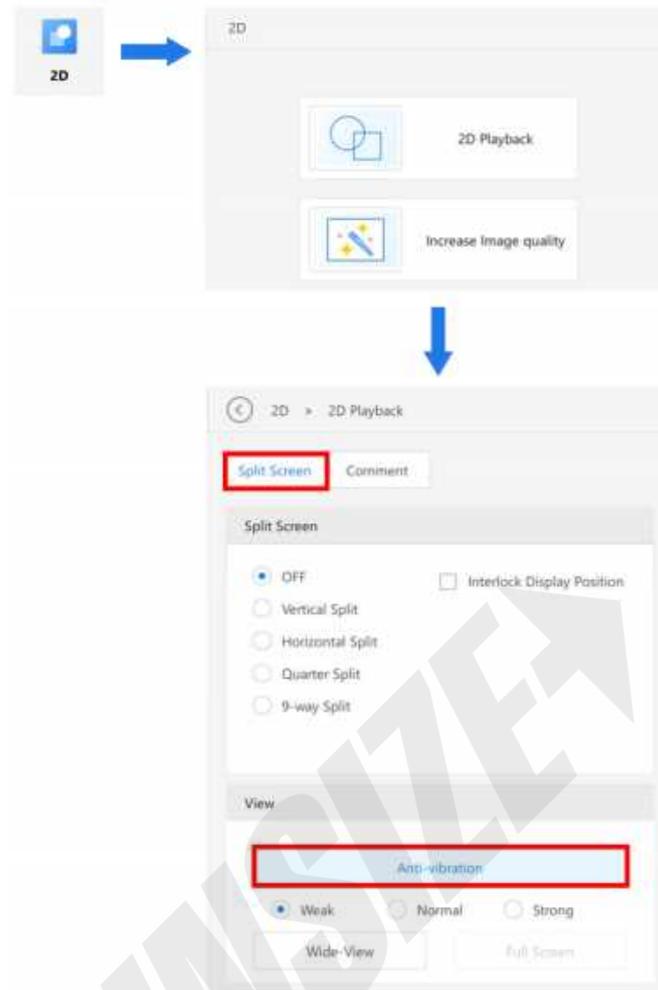
- Operation on Console: Press the **Anti Vibration** button on the console.



- Operation on 3D OM Software:

#### Steps

1. Click [2D].
2. Click [2D Playback].
3. Click the Split Screen tab.
4. Click Anti-vibration option.



### Set Anti-vibration Correction

ITEM	FUNCTION
Weak/Normal/Strong	Adjust the level of anti-vibration correction. The stronger the anti-vibration correction, the more black areas are in the sides of the video stream.

### 6.1.3 Wide-View Display

#### Function

When enabled, you can check the position of the enlarged area and the pre-enlargement image, and drag the display area to move to the position you want to view.

#### Enable Wide-View Display

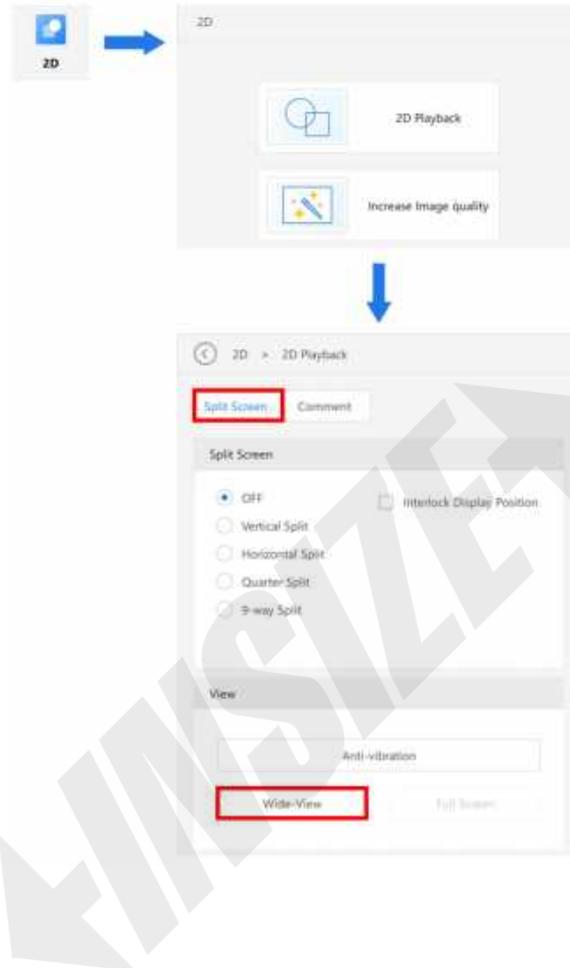
- Operation on 3D OM Software:

## 3D measuring microscope operating instructions

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### Steps

1. Click [2D].
2. Click [2D Playback].
3. Click the Split Screen tab.
4. Click Wide-View option.



### Set Wide View



When the image is enlarged, you can drag the green display area to the position you want to view. When you click Match, the whole picture will be displayed in the observing window. When you click [X1.0], the image will be displayed in actual size (100%).

### 6.1.4 Wheel Zoom

#### Function

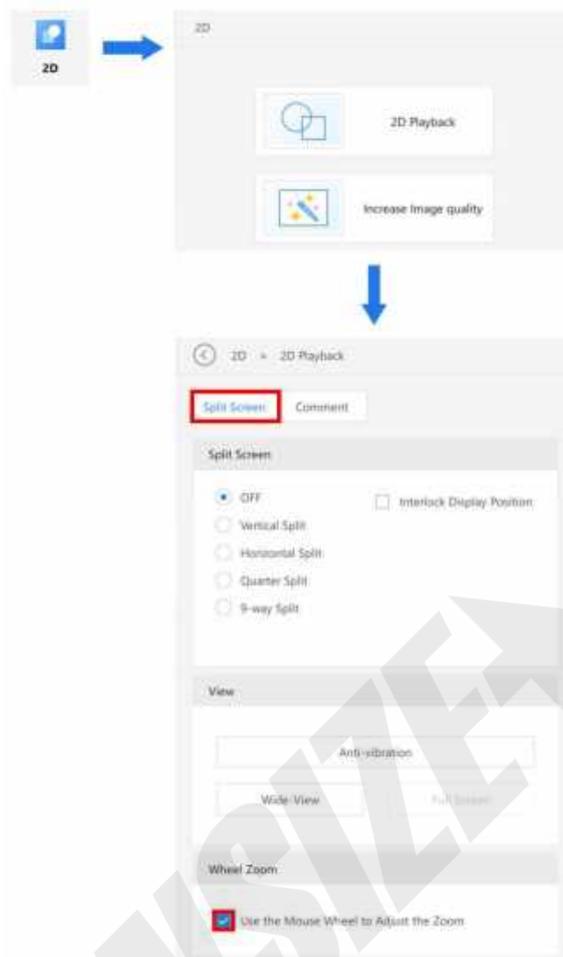
Zooming a specific part of an image via digital zoom does not enhance the image's optical resolution.

#### Enable Wheel Zoom

##### ● Operation on 3D OM Software:

#### Steps

1. Click [2D].
2. Click [2D Display].
3. Click the Split Screen tab.
4. Select Use the Mouse Wheel to Adjust the Zoom.



### 6.1.5 Comment

#### Function

Display text or shape comment mark in video stream area or image. For video stream area comments, you can save as commented image. Note that the saved image cannot be edited.

#### Enable Comment

Enable the comment function on the console or 3D OM software.

- Operation on Console: **Press the** comment button on the Console.



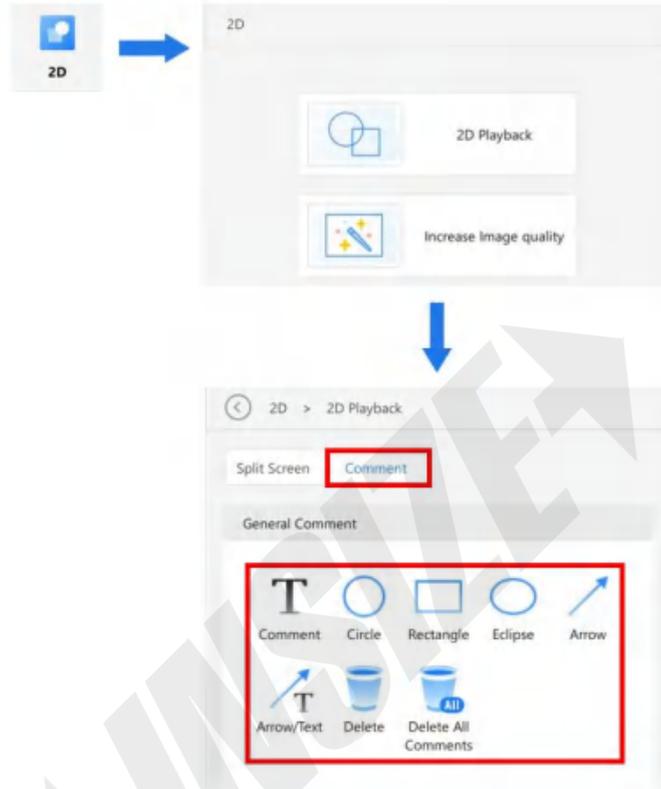
## 3D measuring microscope operating instructions

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- Operation on 3D OM Software:

Steps

1. Click [2D].
2. Click [2D Playback].
3. Click the Comment tab.
4. Click the corresponding comment function tag.

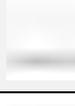


Set Comment

- Normal Comment

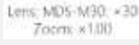
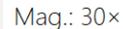
## 3D measuring microscope operating instructions

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ITEM	FUNCTION	EXAMPLE
	Display characters in specified location.	
	Draw circle with click position.	
	Draw rectangle with click position as vertex.	
	Draw ellipse with click location as start point.	
	Draw arrow with click position as start point.	
	Draw arrow with click position as starting point, and end point will show comment.	
	Delete the specified comment.	-
	Delete all comments.	-
Color, Line Width	You can set the color and line width of the comment graph.	-

● Common Annotation 2

## 3D measuring microscope operating instructions

ITEM	FUNCTION	EXAMPLE
	Display current date.	
	Display current time.	
	Display current lens name and digital zoom ratio.	
	Display current tilt angle (to be updated).	-
	Display current total zoom ratio, including optical zoom ratio and digital zoom ratio.	

- Global

ITEM	FUNCTION	EXAMPLE
	Hide all comments.	-
	Delete all comments.	-

## 6.2 Increase Image Quality

### 6.2.1 Opt-SEM

What is Opt-SEM?

By taking multiple images of different illumination directions, you can create a high-color image. On the one hand, you can change the illumination direction, and highlight the difference between the corresponding illuminations. On the other hand, you can highlight the scratches and surface textures that are difficult to observe.

## 3D measuring microscope operating instructions



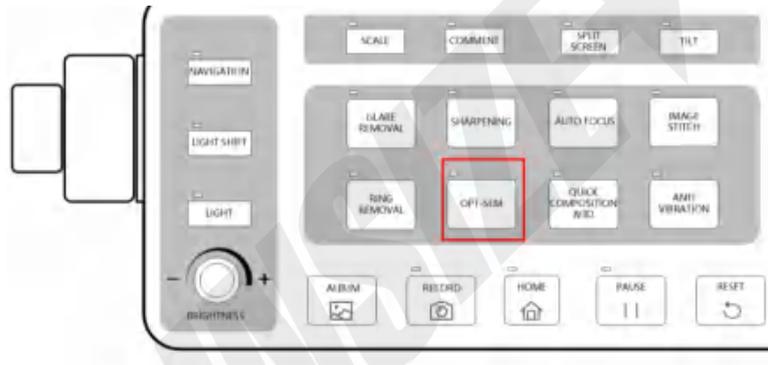
1 Yuan Coin (80 × Original Image)

1 Yuan Coin (80 × Opt-SEM)

### Enable Opt-SEM

#### Steps

1. Focus the target position of the sample.
  2. Enable the Opt-SEM function on the console or 3D OM software.
- Operation on Console: Press the OPT-SEM button on the console.



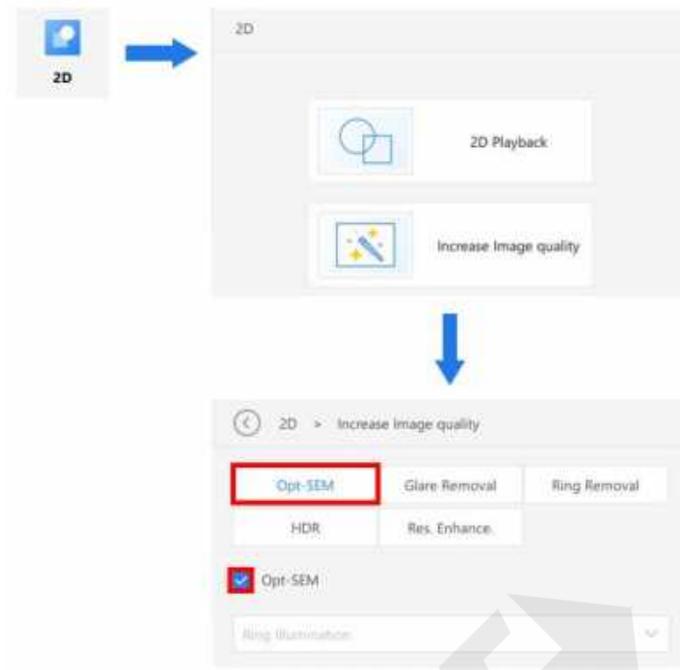
- Operation on 3D OM Software:

#### Steps

1. Click [2D].
2. Click Increase Image Quality.
3. Click the Opt-SEM tab.
4. Enable the Opt-SEM tag.

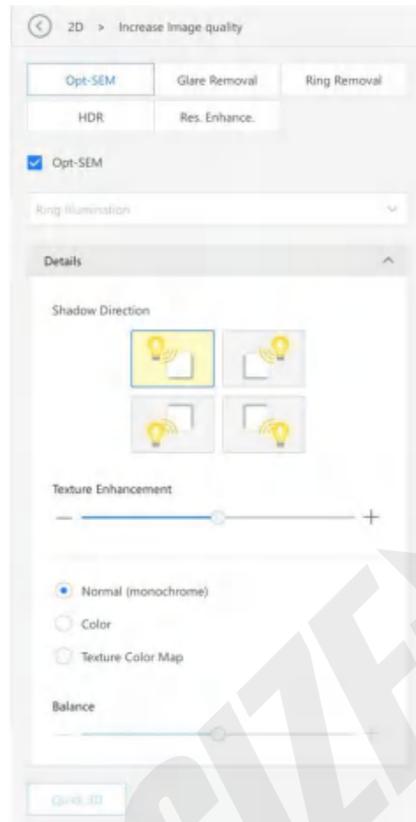
## 3D measuring microscope operating instructions

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Display optical shadow image in video stream window, and then display the detailed settings.

## Set Opt-SEM

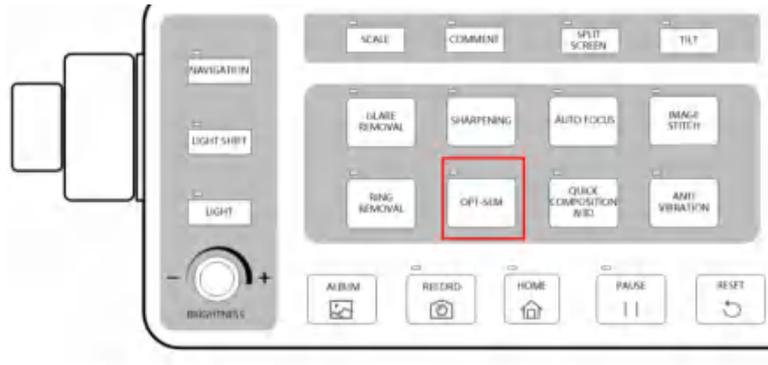


## 3D measuring microscope operating instructions

ITEM	FUNCTION	EFFECT
Shadow Direction	Select the lighting method to be used in optical shadow function.	-
Texture Enhancement	The degree should be between 0 and 100. The higher the value, the higher the texture enhancement effect, and the stronger the shadow light effect.	-
Normal (Monochrome)/Color/Texture Color Map	Select the display method of optical shadow image. The standard is monochrome optical shadow image. The color is the composite image of original picture and monochrome optical shadow. The texture color map is the composite image of monochrome optical shadow and pseudo-colored image.	<p>Normal (Monochrome):</p>  <p>Color:</p>  <p>Texture Color Map:</p> 
Balance	Adjust the balance of optical shadow and pseudo-color when selecting Texture Color Map.	-
Quick 3D	Use optical shadow image for quick 3D composition.	-

### Remove Opt-SEM

- Operation on Console: **Press the OPT-SEM** button on the console again.

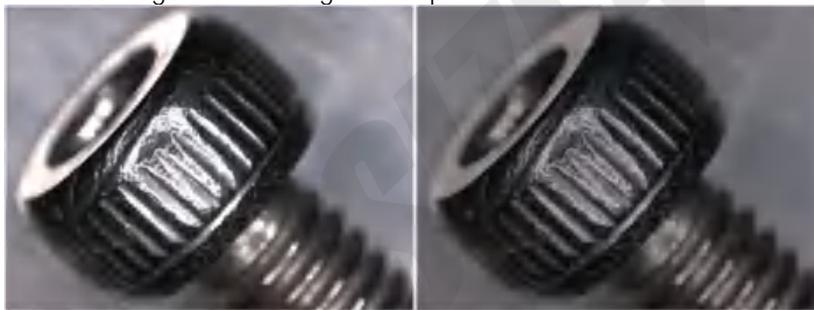


- Operation on software: Click the OPT-SEM tag to deactivate.

### 6.2.2 Glare Removal

What is Glare Removal

By taking multiple images with different exposure time, it can be synthesized as one image to prevent some part of the image from being overexposed.



Screw (30 × Original Picture)

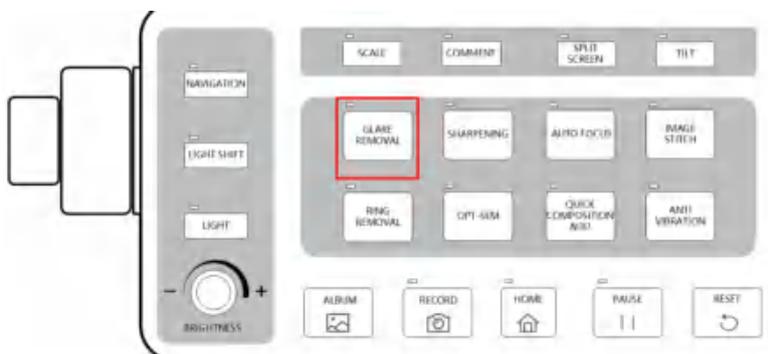
Screw (30 × Glare Removal)

### 6.2.3 Enable Glare Removal

Steps:

1. Focus the target position of the sample.
2. Enable the function of removing glare on the Console or 3D OM software.

- Operation on Console: Press the Glare Removal button.



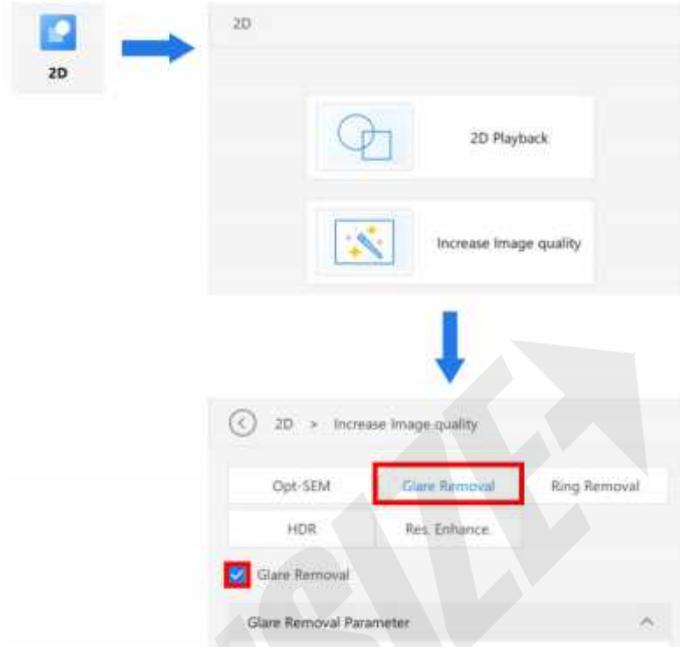
- Operation on 3D OM Software:

## 3D measuring microscope operating instructions

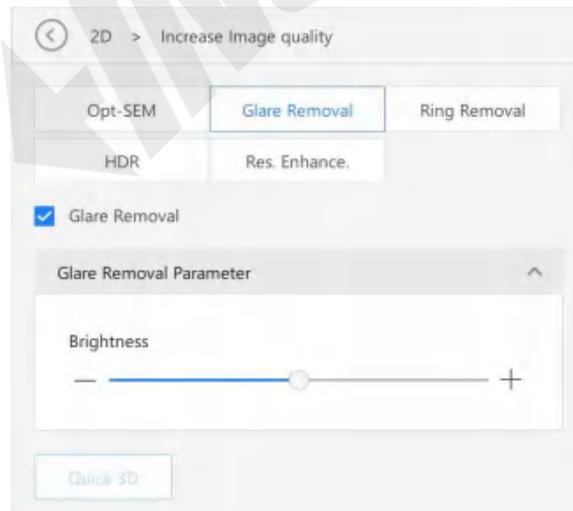
---

Steps:

1. Click [2D].
2. Click [Increase Image Quality].
3. Click the [Glare Removal] tab.
4. Enable the [Glare Removal] tag.



Set Glare Removal

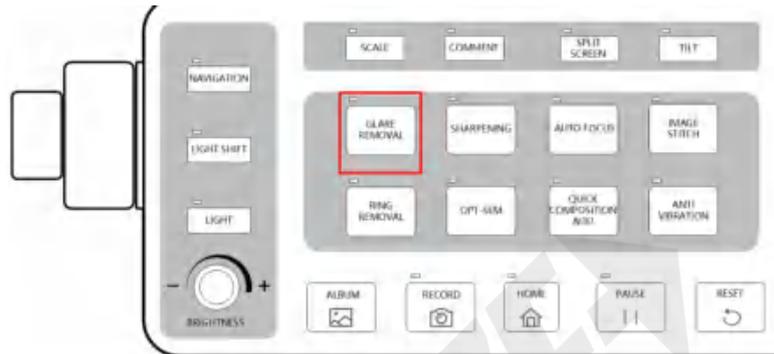


## 3D measuring microscope operating instructions

ITEM	FUNCTION
BRIGHTNESS	Adjust the brightness of glare removal image to adjust the glare removal effect.
QUICK 3D	Use glare removal image for quick 3D composition.

### Remove Glare Removal

- Operation on Console: Press the button on the Console again.

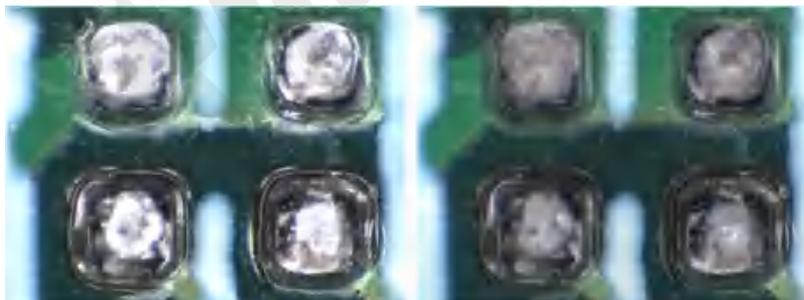


- Operation on software: Click Glare Removal to deactivate.

### 6.2.4 Ring Removal

#### What is Ring Removal?

By taking multiple pictures under the shadow scene, it can be synthesized as one image to prevent the overexposure of some part of the image and effectively control the ring caused by light source on the sample reflective surface.



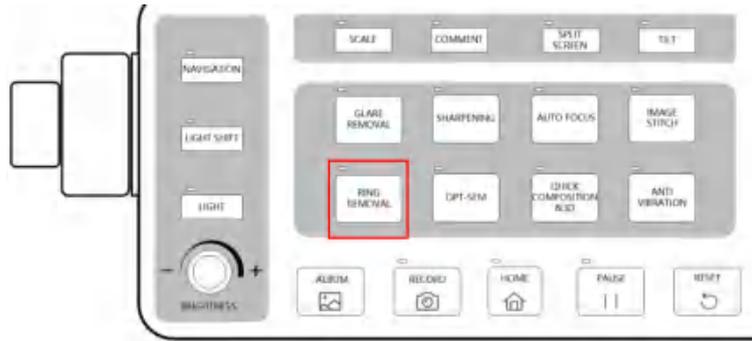
Welding Point (150 × Original Picture)	Welding point (150 × photo-smoothing)
--	---------------------------------------

### Enable Ring Removal

Steps:

1. Focus the target position of the sample.
  2. Enable the function of Ring Removal on the console or 3D OM software.
- Operation on the Console: Press the Ring Removal button on the Console.

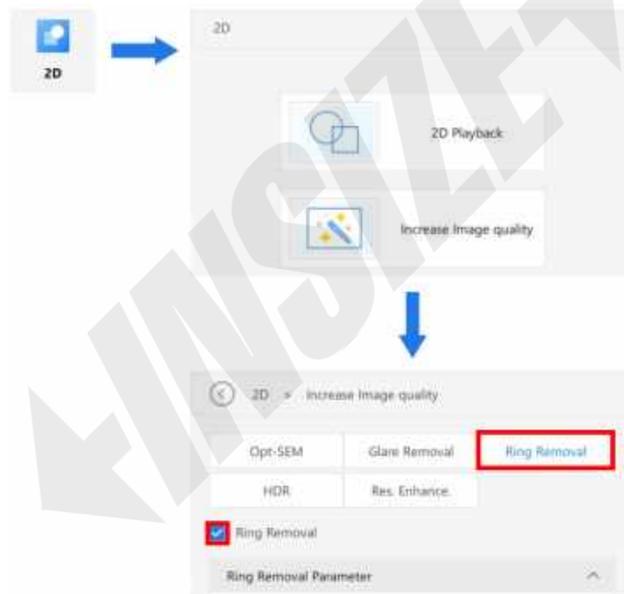
## 3D measuring microscope operating instructions



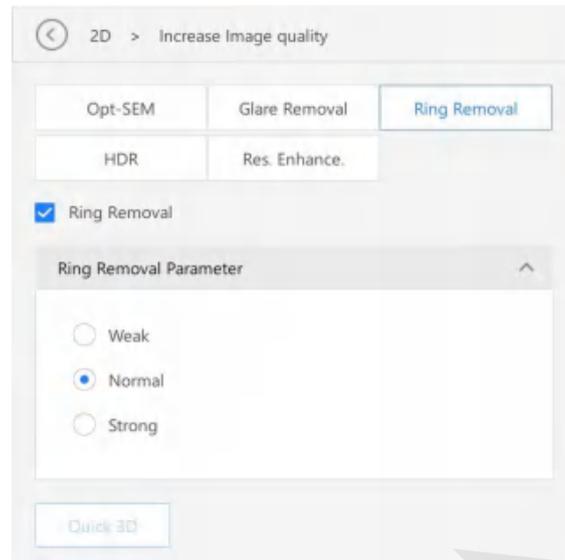
### ● Operation on 3D OM Software:

Steps:

1. Click [2D].
2. Click [Increase Image Quality].
3. Click the [Ring Removal] tab.
4. Enable the [Ring Removal] tag.



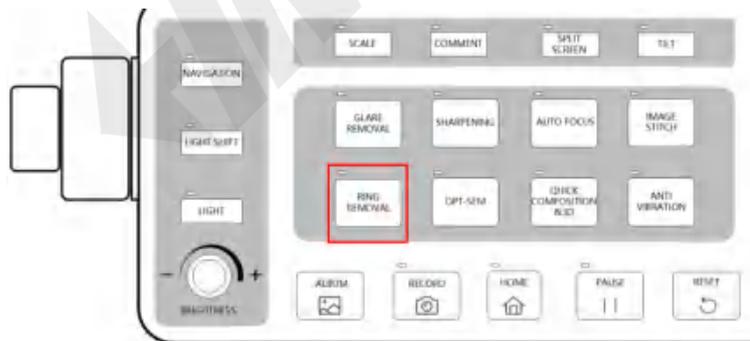
### Set Ring Removal



ITEM	FUNCTION
WEAK/NORMAL/STRONG	Adjust the degree of ring removal. The stronger the parameter, the better the effect, but the color saturation will decrease accordingly.
QUICK 3D	Use ring removal image for quick 3D composition.

### Remove Ring Removal

- Operation on Console: Press the button on the Console again.



- Operation on software: Click the Ring Removal to deactivate.

## 6.2.5 HDR (High Dynamic Range)

### What is HDR (High Dynamic Range)

The dynamic range of a single image can be expanded by taking multiple pictures of changing shutter and creating it as a high-color image. The composite image has a wide range of brightness. Some details of the overexposure position are kept, and the low-color image features are richer.

## 3D measuring microscope operating instructions



Magnetic Suction Part (30 × Original Picture)

Magnetic Suction Part (30 × HDR)

### Open HDR

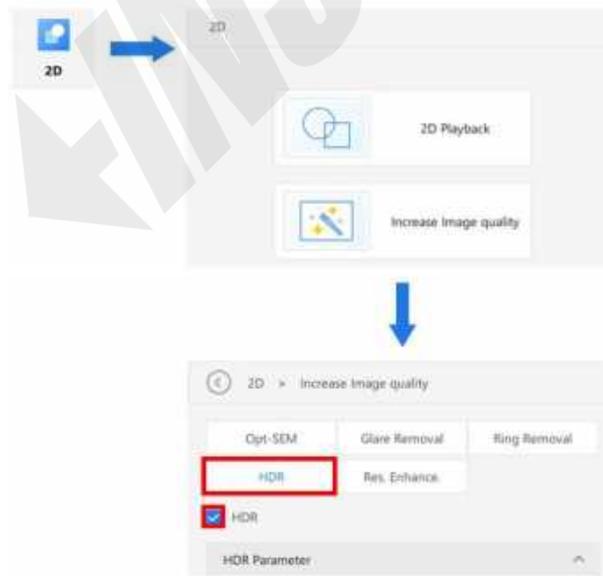
#### Steps:

1. Focus the target position of the sample.
2. Enable HDR function on 3D OM software.

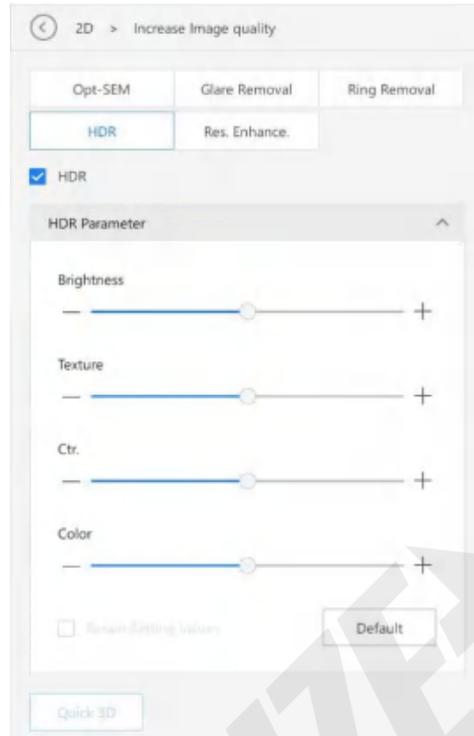
#### ● Operation on 3D OM Software:

#### Steps:

1. Click [2D]
2. Click [Increase Image Quality]
3. Click the [HDR] tab.
4. Enable [HDR] Tag



### Set HDR



ITEM	FUNCTION
BRIGHTNESS	Adjust HDR image brightness
TEXTURE	Adjust the texture of HDR image.
CONTRAST	Adjust HDR image contrast
COLOR	Adjust HDR image color strength.
DEFAULT	Returned HDR parameter default value.
QUICK 3D	Use HDR image for quick 3D Composition.

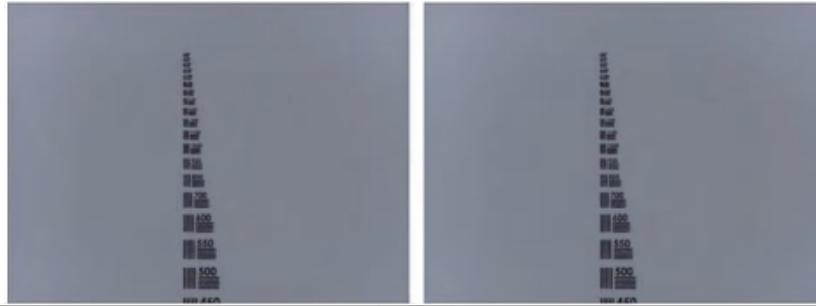
### Cancel HDR

Operation on 3D OM software: Disable [HDR] tag to deactivate.

### 6.2.6 Resolution Enhancement

#### What is Resolution Enhancement?

Increase optical horizontal resolution by adding pixel resolution of a single image. The image will occupy larger space and restore more details.



Target (1000 × Original Picture)

Target (1000 × Enhanced Resolution)

### Enable Resolution Enhancement

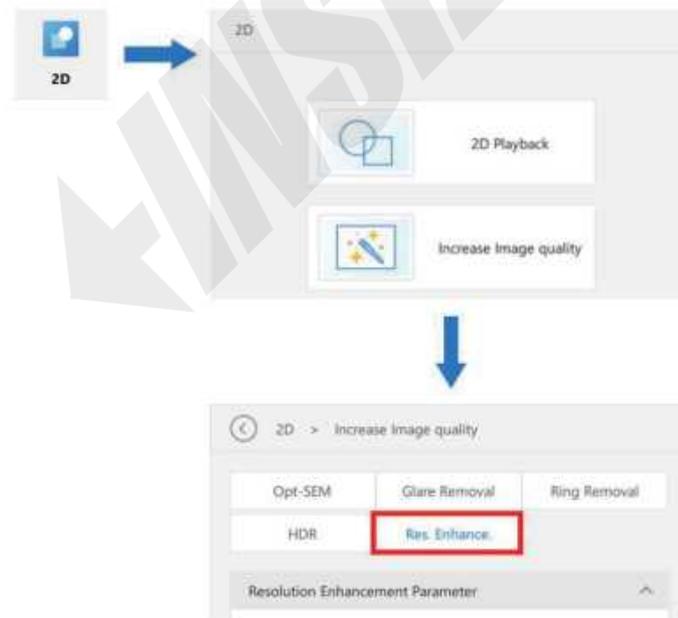
#### Steps:

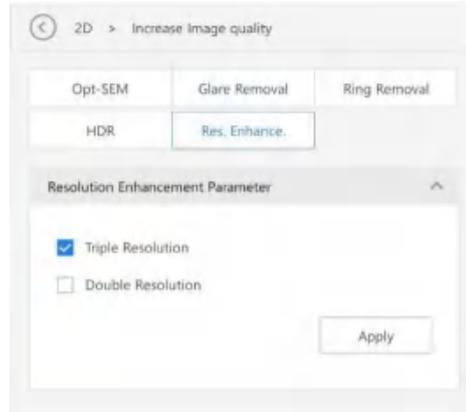
1. Focus the target position of the sample.
2. Enable resolution enhancement on 3D OM software.

#### ● Operation on 3D OM Software:

#### Steps:

1. Click [2D].
2. Click [Increase Image Quality].
3. Click the [Res Enhance] tab.
4. Click [Triple Resolution]/ [Double Resolution] tag.
5. Click [Apply].





ITEM	FUNCTION
TRIPLE RESOLUTION	Adjust the horizontal and vertical resolution of the image to 3 times the original resolution.
DOUBLE RESOLUTION	Adjust the horizontal and vertical resolution of the image to 2 times the original resolution.

### Release Resolution Enhancement

Operation on 3D OM software: Click the tags [Triple Resolution]/ [Double Resolution] to deactivate.

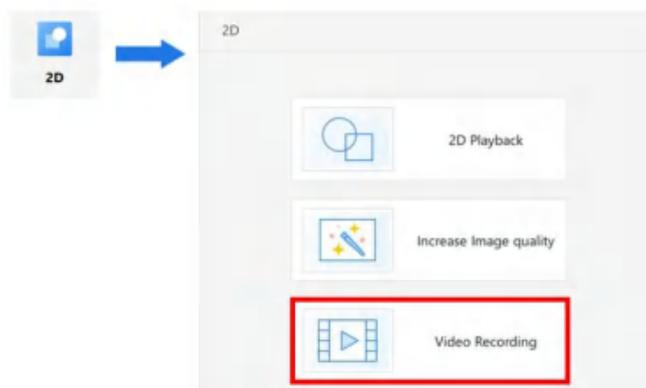
## 6.3 Record Video

### Enable Video Recording

● Operation on 3D OM Software:

Steps:

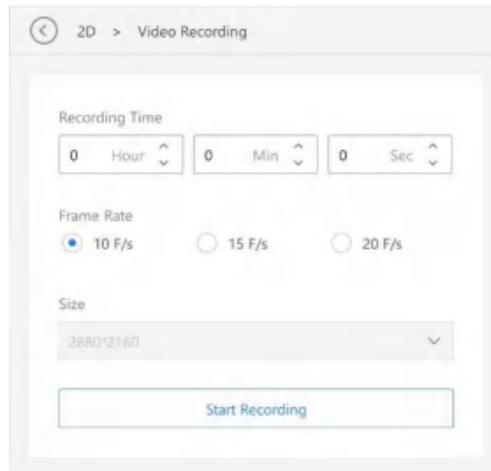
1. Click [2D].
2. Click [Video Recording].



3. Set video recording parameters.

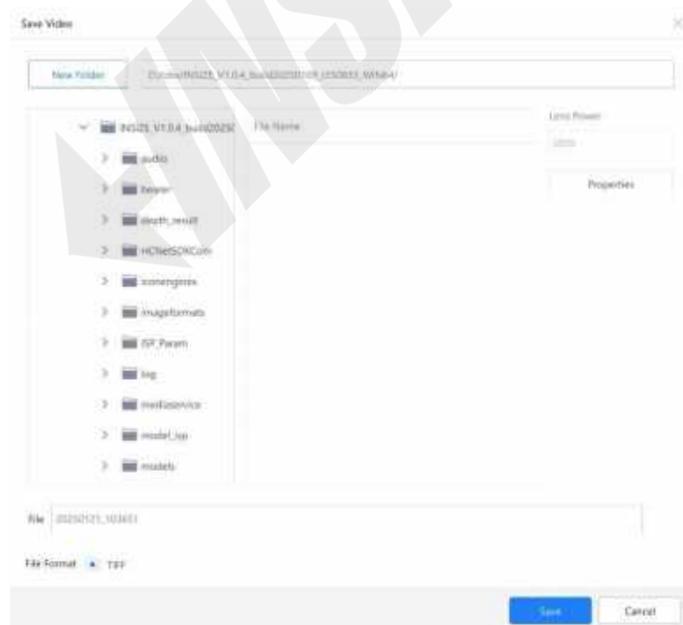
## 3D measuring microscope operating instructions

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ITEM	FUNCTION
RECORDING TIME	It can be set by hour/min/sec. The recording time is 1 second to 20 minutes.
FRAME RATE	It refers to the number of recorded frames in 1 second. Currently, it supports 10/15/20F/s.
SIZE	The larger the video size, the better the picture quality, and the larger the occupied space. Currently, 2880 × 2160 are supported.

#### 4. Click [Save].



Select the folder to save the video, enter the file name, and click [Save]. Click [Cancel] when you want to end recording. Confirmation dialog will be displayed. Click [OK] to save the video in the middle of recording.

## 6.4 Timer Record

### Function of Timer Record

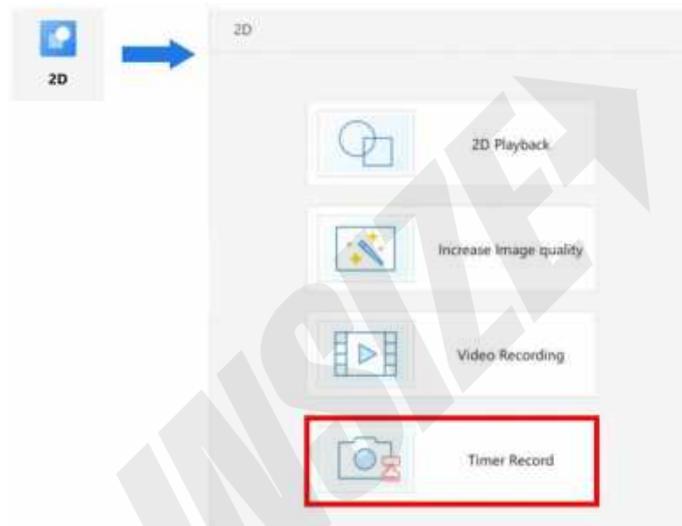
Record according to the specified time interval and the number of taking pictures. It is applicable for recording the changed and growing samples for a long time.

### Enable Timer Record

● Operation on 3D OM Software:

#### Steps:

1. Click [2D].
2. Click [Timer Record].



3. Set timer record parameters.

## 3D measuring microscope operating instructions

ITEM	FUNCTION
RECORD INTERVAL	Set the interval between 20 sec and 23 h 59 min 59 sec.
RECORD NUMBER	Set between 1 and 9999.
FOLDER FOR SAVING	The content is the same as the auto save settings.

#### 4. Start Timer Record.

During timer recording, Timer Recording dialog box will display. Click [Stop] to stop record. The data will be saved to HDD.

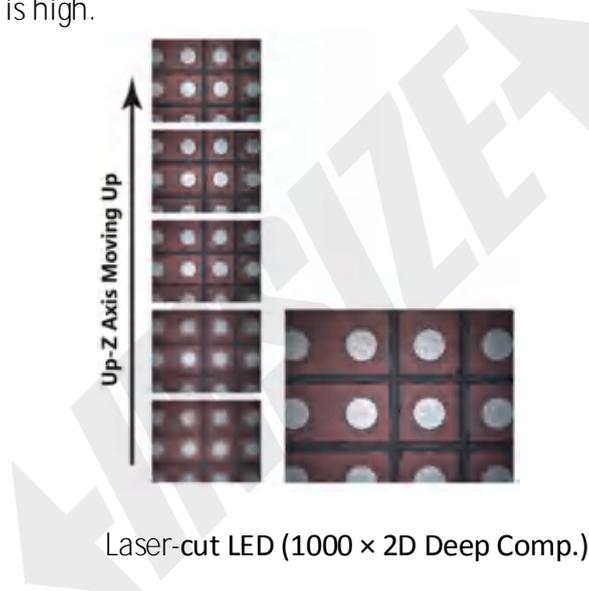
## Chapter 7 3D

The 3D function is used to move the focus Z axis and get the image in the process. The image will be composed to get the 2D depth comp. image and 3D model. 3D function includes quick 3D and fine depth 3D.

### 7.1 Quick 3D

What is quick 3D?

Move the optical system from the lowest to the highest point in the sample position of interest for image composition. In the process, the focus Z axis moves at an even speed. The process is fast and the composition accuracy is high.



#### Enable Quick 3D

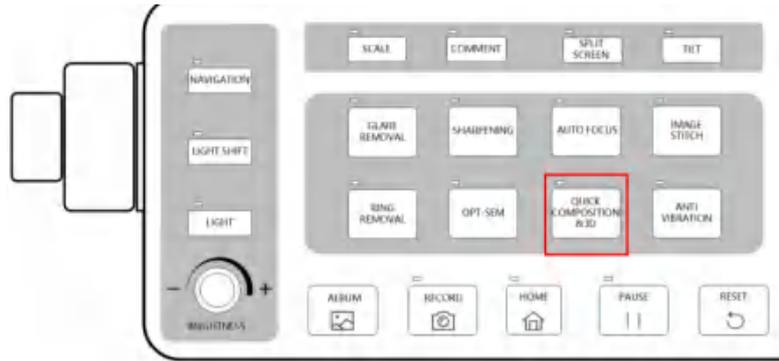
Enable quick 3D function on the console or 3D OM software.

#### ● Operation on Console:

#### Steps

1. Press the quick composition & 3D button on the console to enter the quick 3D menu.
2. Focus the lowest position of the sample in the field.
3. Press the quick composition & 3D button on the console again to execute the composition.

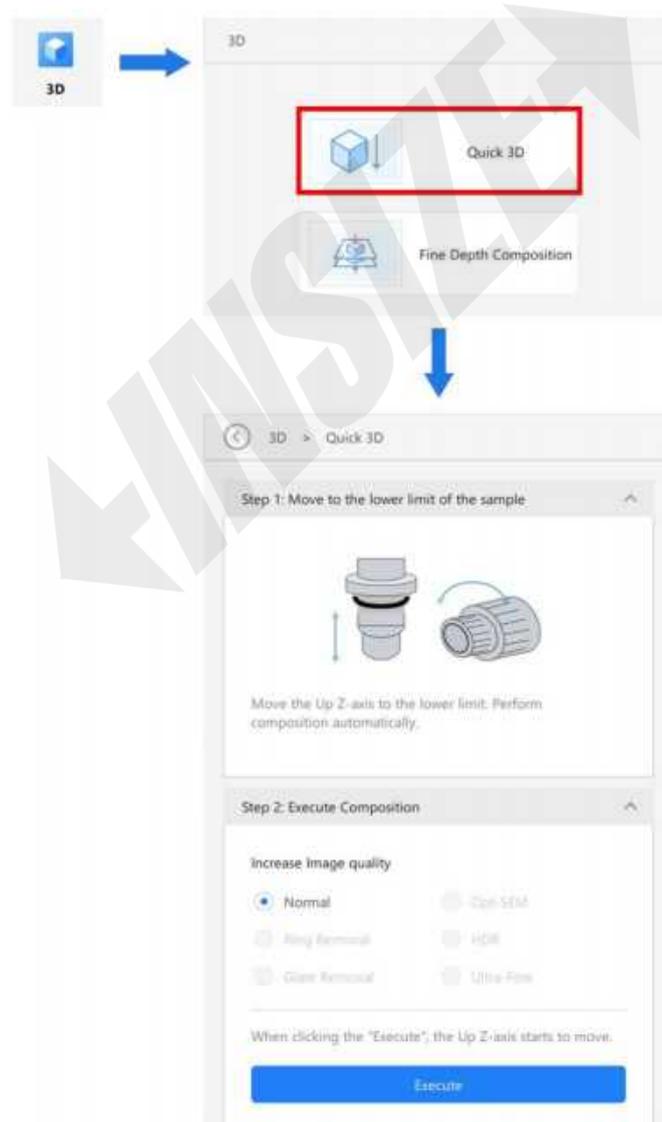
## 3D measuring microscope operating instructions



### ● Operation on 3D OM Software:

Steps

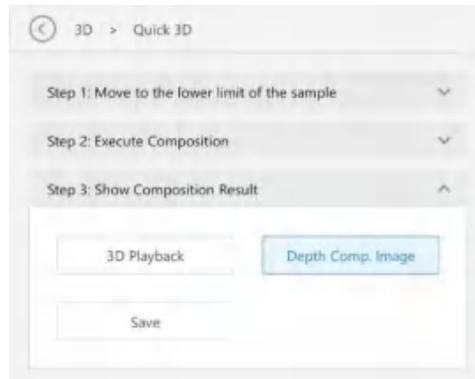
1. Click [3D].
2. Click [Quick 3D].



## 3D measuring microscope operating instructions

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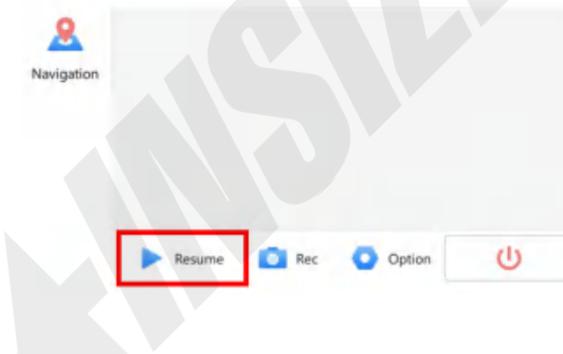
3. Focus the lowest position of the sample in the field.
4. Select image quality as [Normal].
5. Click [Execute].
6. Confirm the result of the composition. The depth composition image will be displayed after composition ends by default.



7. Click [3D Playback] to display the corresponding 3D model of the image.
8. Click [Save] to save the depth comp. image and 3D model.

### Exit Quick 3D

Operation on software: Click [Resume] to return to video stream status.



## 7.2 Fine Depth Composition

### What is Fine Depth Composition

Set the upper and lower limit positions in the sample position of interest, and move the optical system from the lower limit to the upper limit for image composition. During the process, the focus Z axis moves at a fixed interval. The composition accuracy is high, and the process speed is fast.

### Enable Fine Depth Composition

Enable fine depth composition function on 3D OM software.

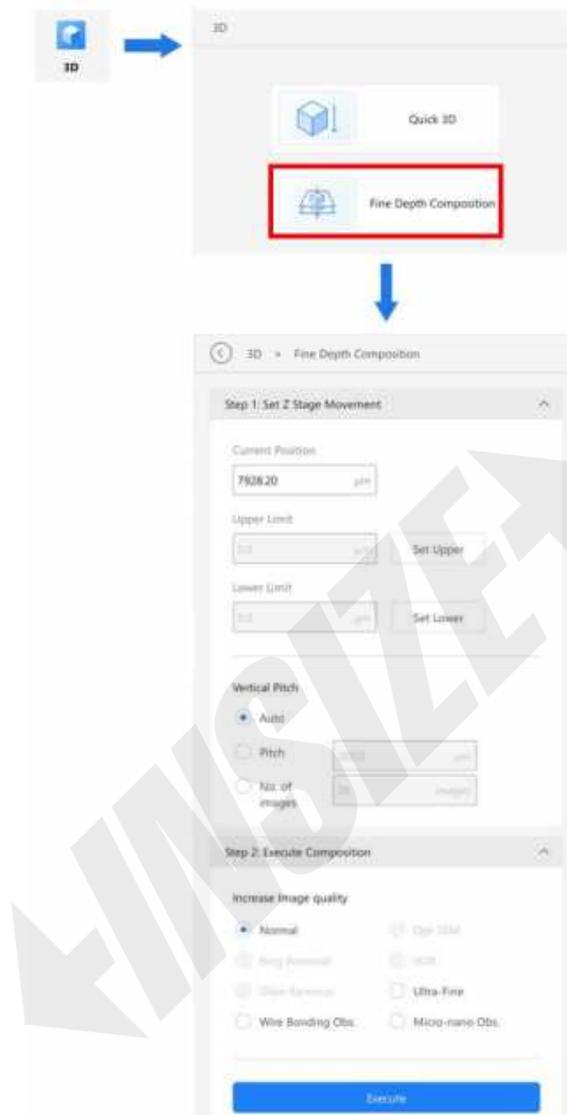
- **Operation on 3D OM Software:**

## 3D measuring microscope operating instructions

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Steps

1. Click [3D].
2. Click [Fine Depth Composition].



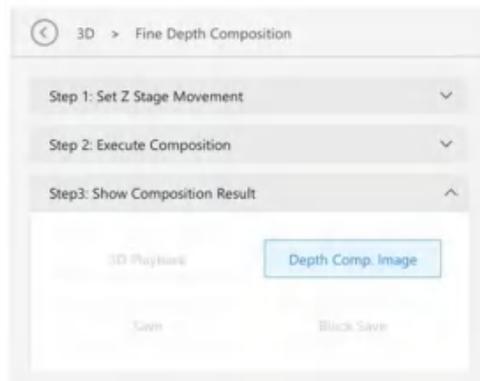
3. Focus the lowest position of the sample in the video field (switch down from the lowest position if necessary).
4. Then click [Set Lower].
5. Focus the highest position of the sample in the video field (switch up from the highest position if necessary).
6. Then click [Set Upper].
7. Click [Auto/Pitch/No of images] to select the moving space settings mode of fine depth composition.
8. Select image quality. Select [Normal] generally. Select [Ultra-Fine] if you want to simultaneously present samples under bright field and dark field illumination. Select [Wire Bonding Obs.] to observe samples with dramatic height differences and continuous morphology. Select [Micro-nano Obs.] to observe fine structures at the sub-micron level.

## 3D measuring microscope operating instructions

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9. Click [Execute].

10. Confirm the result of the composition. The depth composition image will be displayed after composition ends by default.

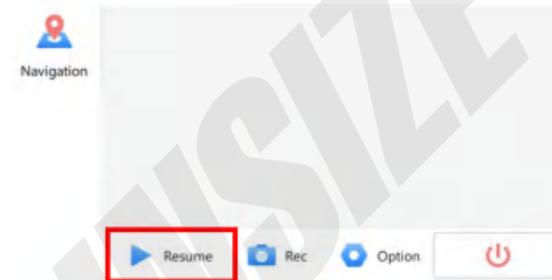


11. Click [3D Playback] to display the corresponding 3D model.

12. Click [Save] to save the depth composition image and 3D model.

### Exit Fine Depth Composition

Operation on software: Click [Resume] to return to video stream status.



## 7.3 3D Playback

### 7.3.1 3D Playback Basic Settings

#### What is 3D Playback

To display 3D composite image or 3D model data in the album, and perform 3D measurement.

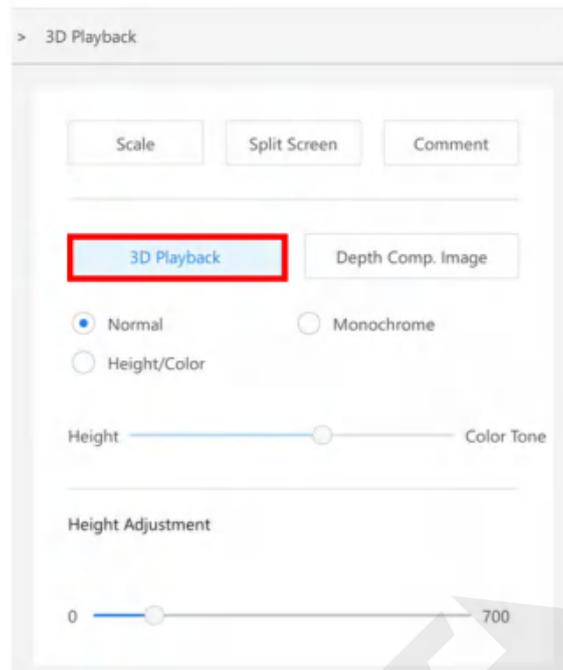
#### Open 3D Playback

Enable 3D playback function on 3D OM software.

#### Steps

1. Click [3D Playback] for 3D composite image or 3D model data in the album.

## 3D measuring microscope operating instructions



2. Operate the mouse wheel and left button to zoom and rotate the 3D model. The model zooming and rotation speed are proportional to the operating speed.

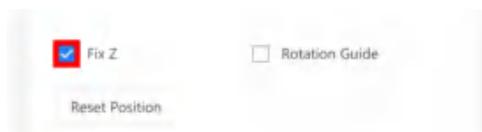
3. Rotate: Hold the left mouse button, drag in the corresponding direction, rotate the model in the corresponding direction, release the left button, and stop the rotation.



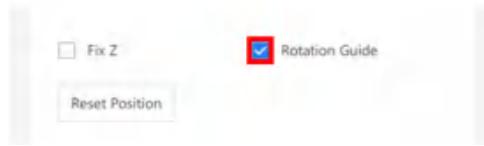
4. Zoom: Scroll the mouse wheel up to zoom in. Scroll down to zoom out.



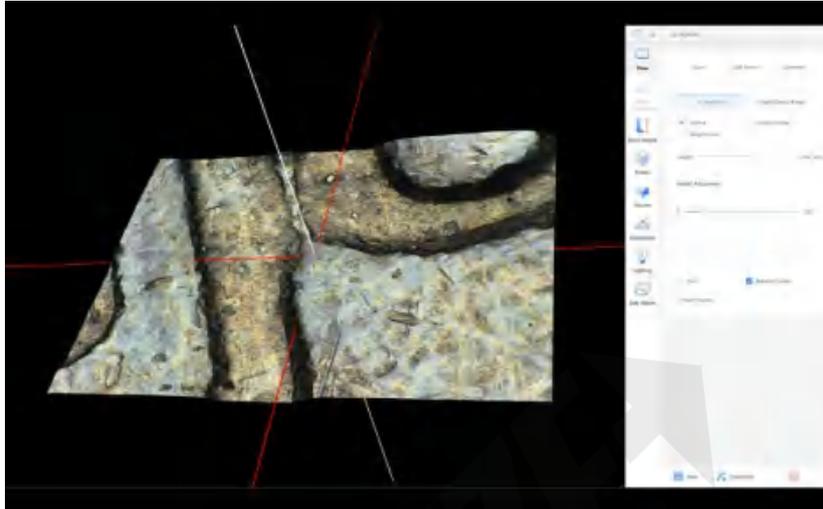
- Fix Z: Select [Fix Z], and the operations such as rotation will be done with Z axis fixed.



- Rotation Guide: Select [Rotation Guide]. The current X, Y, and Z axes will appear on the 3D model.



Example:



### 7.3.2 3D Scale

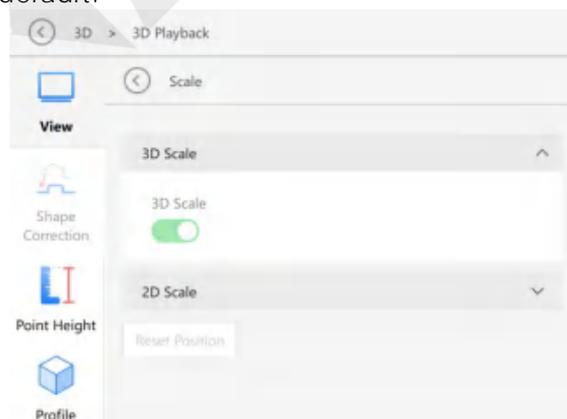
Enable 3D scale function on 3D OM software.

Steps

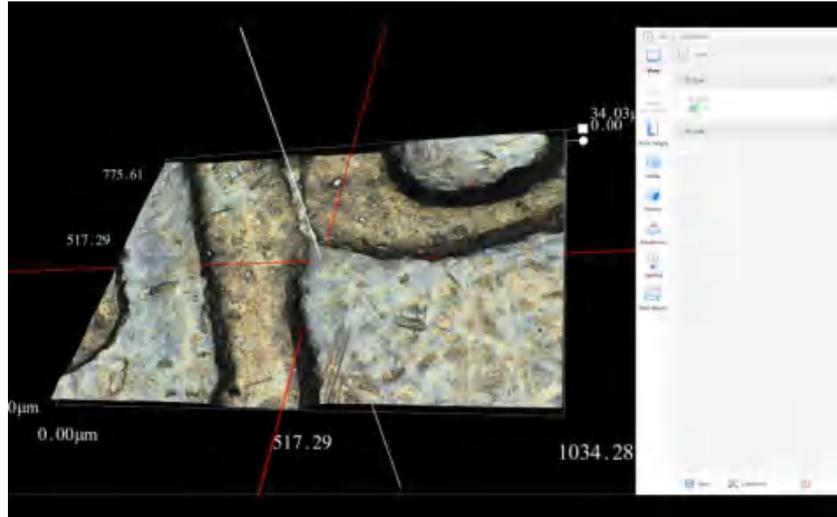
1. Click [Scale].



2. [3D Scale] is enabled by default.



Example:



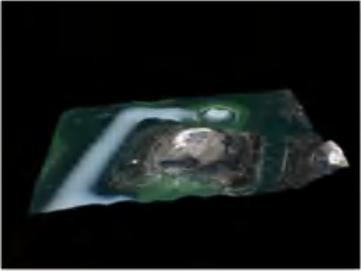
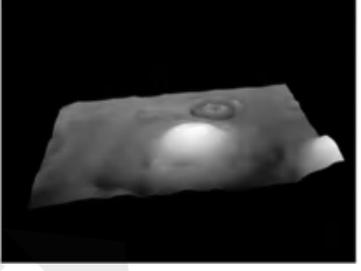
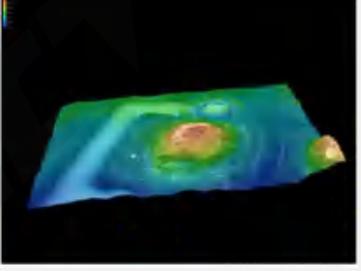
### 7.3.3 3D Comment

Refer to [Comment] chapter for details.

### 7.3.4 3D Playback Settings



## 3D measuring microscope operating instructions

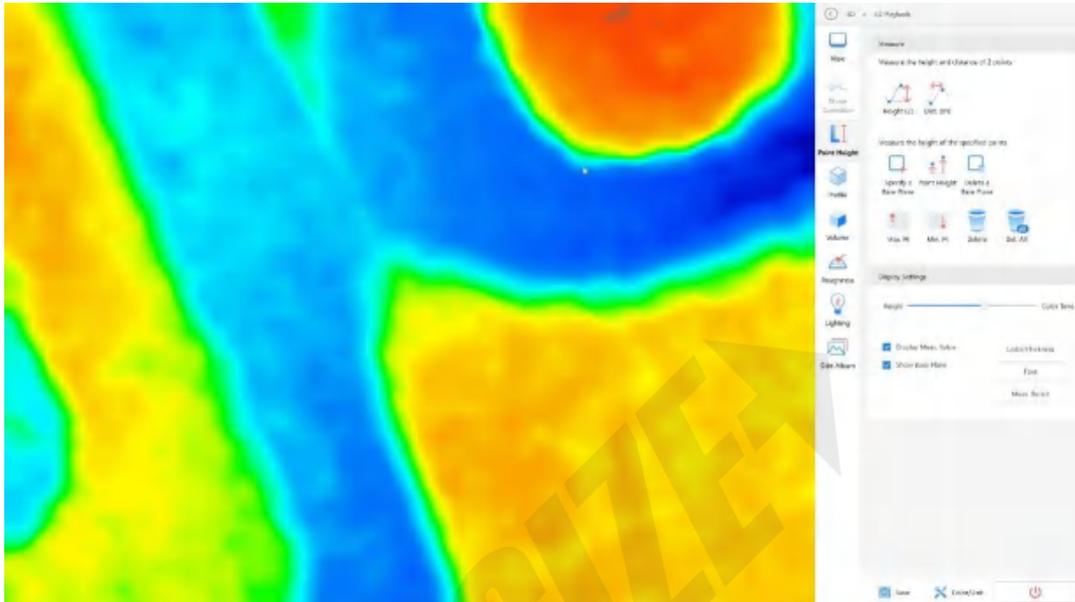
ITEM	FUNCTION	EFFECT
NORMAL/ MONOCHROME/ HEIGHT/COLOR	<p>The 3D model map is the original image, displaying surface color and texture.</p>	
	<p>The surface map is removed from the 3D model. The height of the sample is made with monochrome. The high place is white and the low place is black.</p>	
	<p>The height/color slider can be operated. The height part is the image of real sample, and the color part is the image of height pseudo-color. The slider position determines the overlay.</p>	
HEIGHT ADJUSTMENT	<p>Change the Z-axis display ratio of 3D model. The X, Y, and Z axes ratio is 1:1 by default. Move the slider to the left/right, and the Z-axis ratio will decrease/increase.</p>	-
WIDE-VIEW/ HDR ADJUSTMENT / OPT-SEM ADJUSTMENT	To be updated	-

### 7.4 Point Height Measurement

Point height measurement is used to measure the height of the 3D model.

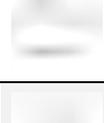
#### 7.4.1 Open Point Height Measurement

Example:

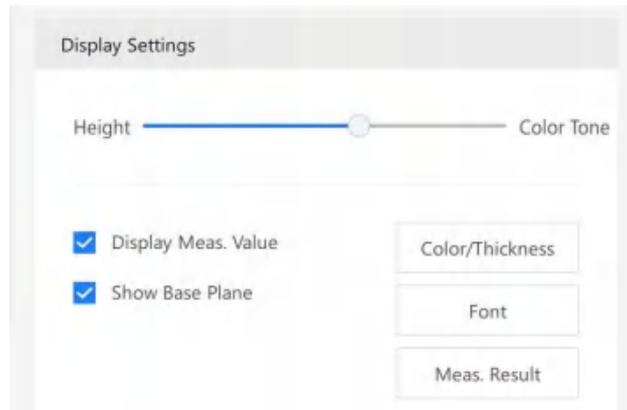


## 3D measuring microscope operating instructions

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ITEM	FUNCTION
	Measure height between two points.
	Measure the distance between two points.
	Use rectangle to specify the measured base plane Z=0.
	Height information measured from the base plane.
	Delete the currently specified base plane.
	Max. Height Point in Selected Area
	Min. Height Point in Selected Area
	Delete Selected Measurement Result
	Delete All Measurement Results

## 7.4.2 Point Height Display Settings



ITEM	FUNCTION
HEIGHT/COLOR TONE	Show Pseudo Color Height Map/Show Sample True Color
DISPLAY MEAS. VALUE	Display Measurement Value on Picture
DISPLAY BASE PLANE	When the base plane is specified, it will be displayed on the picture.
COLOR/THICKNESS	Set the color and thickness of the assist lines between two points, the height of the point, the Max. Pt/Min. Pt, and the assist lines.
FONT	Set the font and font size of area result displayed by the height of the point.
MEAS. RESULT	Display point height information and corresponding measurement result on image.

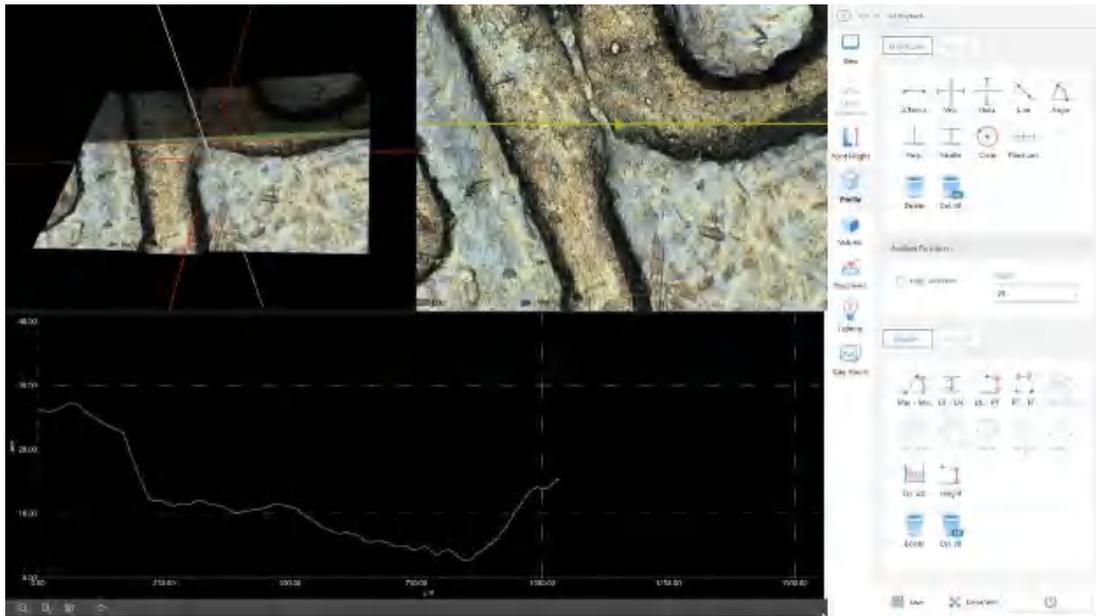
## 7.5 Profile Measurement

Profile measurement is used to measure the cross-sectional shape of the 3D model.

### 7.5.1 Enable Profile Measurement

Example:

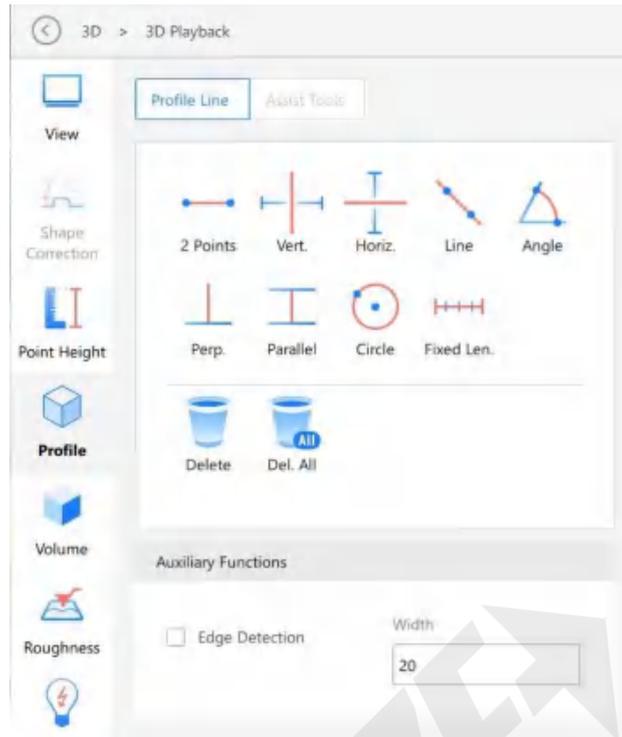
## 3D measuring microscope operating instructions



NO.	ITEM	FUNCTION
(1)	Measurement Result	Display profile information and corresponding measurement result on image.
(2)	3D Model Display Area	Display the 3D model corresponding to the image and the section corresponding to the selected profile line; you can operate the 3D model.
(3)	Depth Comp. Image Display Area	Display model's corresponding depth comp. image. You can set profile line on the image.
(4)	Profile Tool	Used to set profile line.
(5)	Measurement Tool	Used for measuring outline.
(6)	Profile Display Area	Display height information of the selected profile line on the image.

### 7.5.2 Profile Measurement Settings

## 3D measuring microscope operating instructions



## 3D measuring microscope operating instructions

ITEM	FUNCTION
	Use the line between the two points as the profile line.
	Use the line perpendicular to the X axis as the profile line.
	Use the line parallel to the X axis as the profile line.
	Use the line crossing two dots as the profile line.
	Use the line that crosses the reference line by the specified point and by the specified angle as the profile line.
	Line perpendicular to the reference line is used as the profile line.
	Use the line parallel to the reference line as the profile line.
	Use the circle of the specified 2 dots as the profile line.
	Use the specified length segment in any direction as the profile line.
	Delete a profile line in the image display area.
	Delete all profile lines in the image display area

### Auxiliary Function

- Edge Detection

## 3D measuring microscope operating instructions

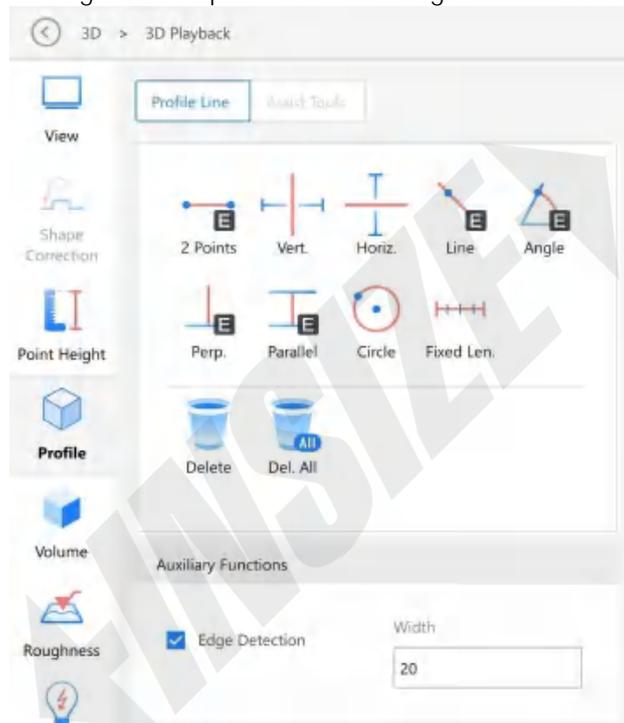
Extract the edge of the measurement object, and auto correct the measurement line to minimize the error of manual measurement.



Steps

1. Select the function of “Edge Detection” in “Auxiliary Function”.

“E” will appear in the bottom right corner of the profile line icons of “2 Points”, “Line”, “Angle”, “Perp.”, and “Parallel”, meaning that the profile line setting Item has the function of edge detection.

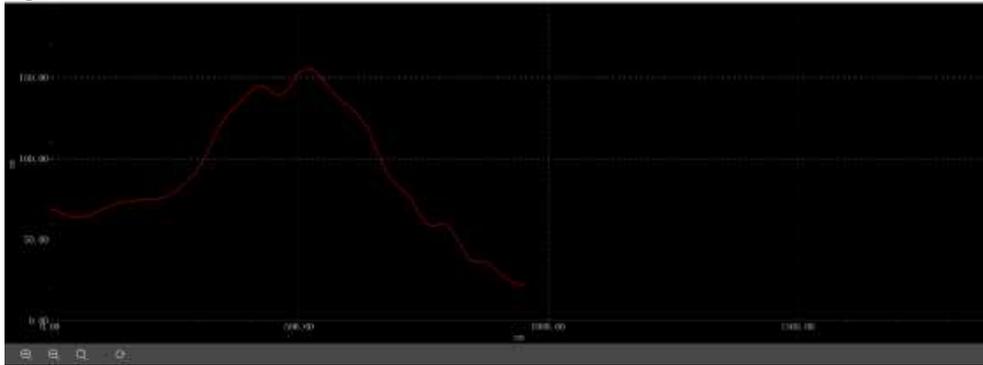


2. Draw a point or line near the test object according to the profile line setting steps. The point or line is automatically adsorbed to the point or line that is recognized in the width range.

## 3D measuring microscope operating instructions

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### Profile Display Area



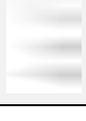
ITEM	FUNCTION
	Zoom in the profile display area by 1.5 times.
	Reduce the profile display area to 2/3.
	<p>Set the axis of the profile line display area.</p>  <p>You can set the X-axis and Z-axis display ranges using the max. value and min. value respectively.</p>
	Restore Coordinate Ratio

## Measurement Settings



← WMSIZE →

## 3D measuring microscope operating instructions

ITEM	FUNCTION
	Detect the height difference between the highest point and the lowest point of Z axis direction in the specified range.
	Measure distance between two lines.
	Measure the distance between line and point.
	Horizontal: Measure the horizontal distance between the two points (x direction).
	Vertical: Measure the vertical distance between the two points (z-direction).
	Min.: Measure straight line distance between two points.
	(To be updated)
	(To be updated)
	(To be updated)
	(To be updated)
	(To be updated)
	(To be updated)
	Crs. Sct. (Up): Measure the selected line range and the area of the surrounding area of the upper profile.
	Crs. Sct. (Down): Measure the selected line range and the area of the surrounding area under the profile.

## 3D measuring microscope operating instructions

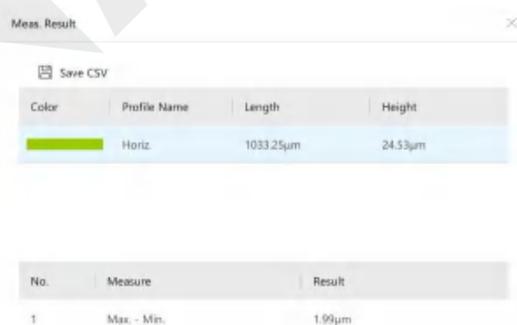
	Measure height of specified point and base plane 0.
	Delete Selected Measurement Segment
	Delete all measurement intervals displayed on the profile.

### Profile Measurement Result



ITEM	FUNCTION
DISPLAY MEAS. VALUE	Display profile measurement value in profile display area.
DISPLAY VALUE HORIZONTAL	Switch horizontal/vertical profile measurement result.

After clicking [Measure Result], the measurement result window will pop up and select to display the main measurement data.



## 3D measuring microscope operating instructions

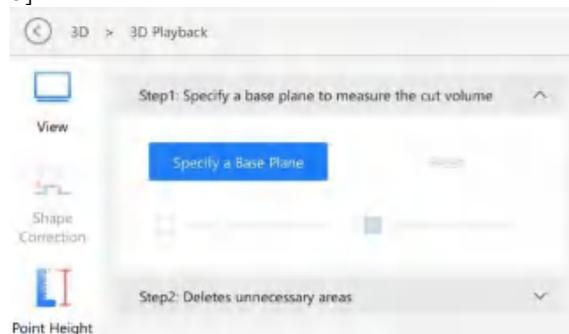
ITEM	FUNCTION
SAVE CSV	Save the measurement data as CSV file.
COLOR	Display the color of measurement profile line.
PROFILE NAME	Display the settings corresponding to the measurement profile line.
LENGTH	Display length range (coordinate axis X-axis) in XY plane of the measurement profile line.
HEIGHT	Display height range on Z axis of the measurement profile line.
NO.	Display serial No. tag corresponding to measurement data.
MEASURE	Show measurement Item name.
RESULT	Display measurement Item result
FONT	Set font and font size of the displayed profile area.
SAVING WAVEFORM CSV	Save the profile line raw data as CSV file.

## 7.6 Volume Measurement

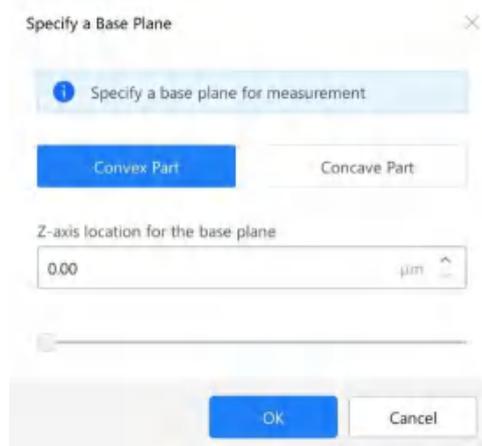
### 7.6.1 Enable Volume Measurement

Steps

1. Click [Specify a Base Plane].



2. Specify Convex Part/Concave Part of the 3D model and Z-axis location for the base plane.



## 7.6.2 Volume Measurement Settings

Steps

1. Click OK to show measurement result in the measurement result dialog.



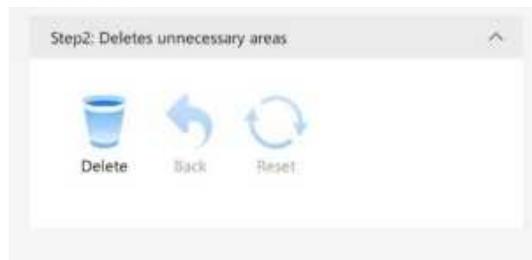
The "Volume Measurement Result" dialog box includes a "Save CSV" button and a table with the following data:

No.	Volume	Surface Area	Crs. Sct.
1	0.01mm <sup>3</sup>	0.78mm <sup>2</sup>	0.78mm <sup>2</sup>

Below the table is a "Count" section with a sub-table:

Stats.	Volume	Surface Area	Crs. Sct.
Average	0.01mm <sup>3</sup>	0.78mm <sup>2</sup>	0.78mm <sup>2</sup>
Maximum	0.01mm <sup>3</sup>	0.78mm <sup>2</sup>	0.78mm <sup>2</sup>
Minimum	0.01mm <sup>3</sup>	0.78mm <sup>2</sup>	0.78mm <sup>2</sup>
Total	0.01mm <sup>3</sup>	0.78mm <sup>2</sup>	0.78mm <sup>2</sup>

2. Delete unnecessary area as needed.



## 3D measuring microscope operating instructions

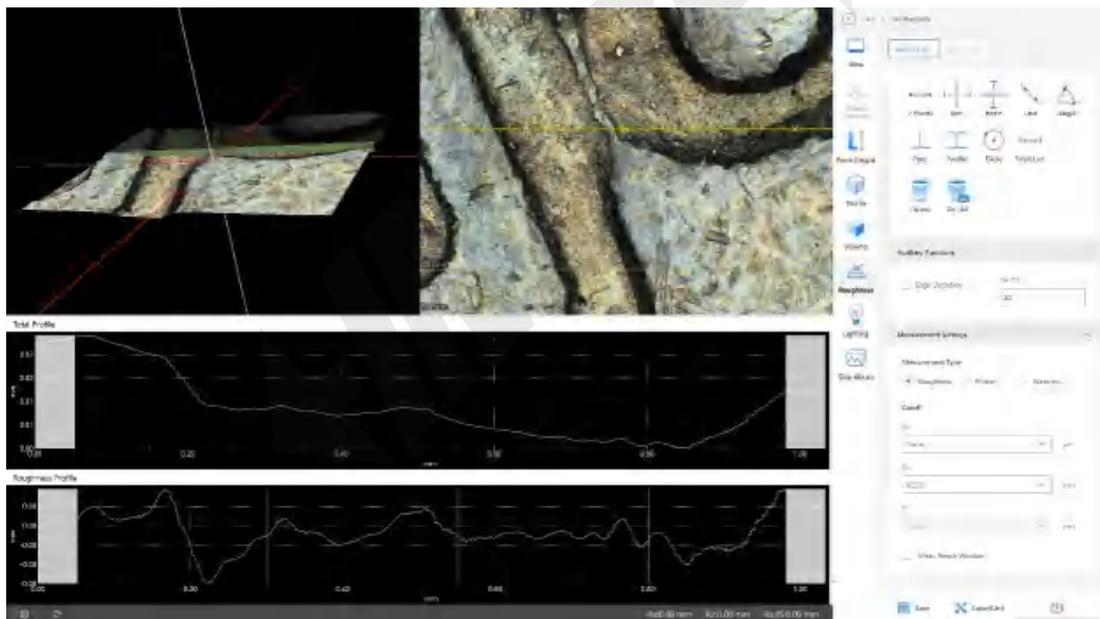
ITEM	FUNCTION
DELETE	Delete corresponding convex part/concave part from the measurement object.
BACK	Cancel previous operation.
RESET	Cancel all delete operation.

### 7.7 Roughness Measurement

Roughness measurement is used to measure the roughness of 3D model profile line.

#### 7.7.1 Enable Roughness Measurement

Example:



## 3D measuring microscope operating instructions

NO.	ITEM	FUNCTION
(1)	Measurement Results	Lists profiles and elements placed on the image and measurement results.
(2)	3D Display Area	Displays a stereoscopic shape of the target object and the cross section of the selected profile. You can change and manipulate the 3D image display.
(3)	Image Display Area	Displays an image of the target object when you see it perpendicular to the reference plane. You can set a profile line on this image. You can also change the display type of the image.
(4)	Total Profile	Displays the roughness/primary/waviness curve obtained using the profile line settings.
(5)	Roughness/Primary/Waviness Profile	Displays the roughness/primary/waviness curve to <b>which the cutoff value</b> specified in the line roughness measurement settings is applied.
(6)	Measurement Settings	<b>Selects a measurement type and sets the cutoff</b>
(7)	Profile Operation Controls	Changes the method to view the roughness/primary/waviness profile and the measurement primary profile in the direction of the Z axis.
(8)	Measure Result Display Area	Roughnesses Ra, Rz, and Rq and parameters corresponding to the roughnesses are displayed by measurement type.

### 7.7.2 Roughness Measurement Settings

Set profile line to be tested in depth comp. image, and corresponding primary profile will be displayed.

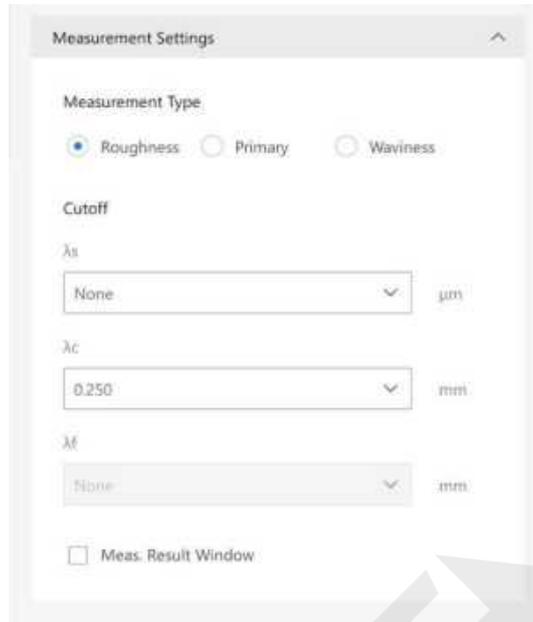
### 3D measuring microscope operating instructions

ITEM	FUNCTION
	Use the line between the two points as profile line.
	Use the line vertical to the X axis as profile line.
	Use the line parallel to the X axis as profile line.
	Use the line crossing two dots as profile line.
	Use the line that crosses the reference line by the specified point and by the specified angle as profile line.
	Use the line vertical to the reference line as profile line.
	Use the line parallel to the reference line as profile line.
	Use the circle of the specified 2 dots as profile line.
	Use the specified length segment in any direction as profile line.
	Delete a profile line in the image display area.
	Delete all profile lines in image display area

## 3D measuring microscope operating instructions

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- Select Measurement Type



ITEM	FUNCTION
MEASUREMENT TYPE	Display roughness/primary /waviness profile.
CUTOFF	$\lambda_s$ Min. value is 2 pixels, max. value is 1/2 of the profile line length.
	$\lambda_c$ and $\lambda_f$ min. value should be 5 pixels or 0.025 mm. Max. value is the x-axis length.

- Measurement Result

### 3D measuring microscope operating instructions

PARAMETER	DESCRIPTION	ROUGHNESS	PRIMARY	WAVINESS
MAXIMUM PROFILE PEAK HEIGHT	Maximum profile peak height indicates the point along the sampling length at which the curve is highest.	$R_p$	$P_p$	$W_p$
MAXIMUM PROFILE VALLEY DEPTH	Maximum profile valley depth indicates the point along the sampling length at which the profile curve is lowest.	$R_v$	$P_v$	$W_v$
MAXIMUM HEIGHT OF PROFILE	Maximum height of the profile indicates the absolute vertical distance between the Maximum profile peak height and the Maximum profile valley depth along the sampling length.	$R_z$	$P_z$	$W_z$
MEAN HEIGHT OF PROFILE ELEMENTS	Mean height of profile elements indicates the average value of the height of the curve element along the sampling length.	$R_c$	$P_c$	$W_c$
TOTAL HEIGHT OF PROFILE	Total height of profile is the vertical distance between the Maximum profile peak height and the Maximum profile valley depth along the evaluation length.	$R_t$	$P_t$	$W_t$
ARITHMETIC MEAN DEVIATION	Arithmetical mean height indicates the average of the absolute value along the sampling length.	$R_a$	$P_a$	$W_a$
ROOT MEAN SQUARE DEVIATION	Root mean square deviation indicates the root mean square along the sampling length.	$R_q$	$P_q$	$W_q$
SKEWNESS	Skewness uses the cube of the root mean square deviation to display the dimensionless cube of the sampling length $Z(x)$ .	$R_{sk}$	$P_{sk}$	$W_{sk}$

## 3D measuring microscope operating instructions

KURTOSIS	Kurtosis uses the fourth power of the root mean square deviation to display the dimensionless fourth power of the sampling length $Z(x)$ .	$R_{ku}$	$P_{ku}$	$W_{ku}$
MEAN WIDTH OF THE PROFILE ELEMENTS	Mean width of the profile elements indicates the average value of the length of the profile element along the sampling length.	$R_{Sm}$	$P_{Sm}$	$W_{Sm}$
ROOT MEAN SQUARE SLOPE	Root mean square slope indicates the root mean square of the local tilt $dZ/dX$ along the sampling length.	$R_{\Delta q}$	$P_{\Delta q}$	$W_{\Delta q}$
CROSS POINT AVERAGE ROUGHNESS (Rz JIS)	Cross point average roughness is the value expressed in microns ( $\mu\text{m}$ ) that is obtained by extracting only the sampling length from the roughness profile in the direction of its average line and finding the sum of the averages of the absolute values of the height ( $Y_p$ ) from the highest peak to the 5th peak and those of the height ( $Y_v$ ) from the lowest bottom to the 5th bottom.	$R_{zJIS}$	-	-

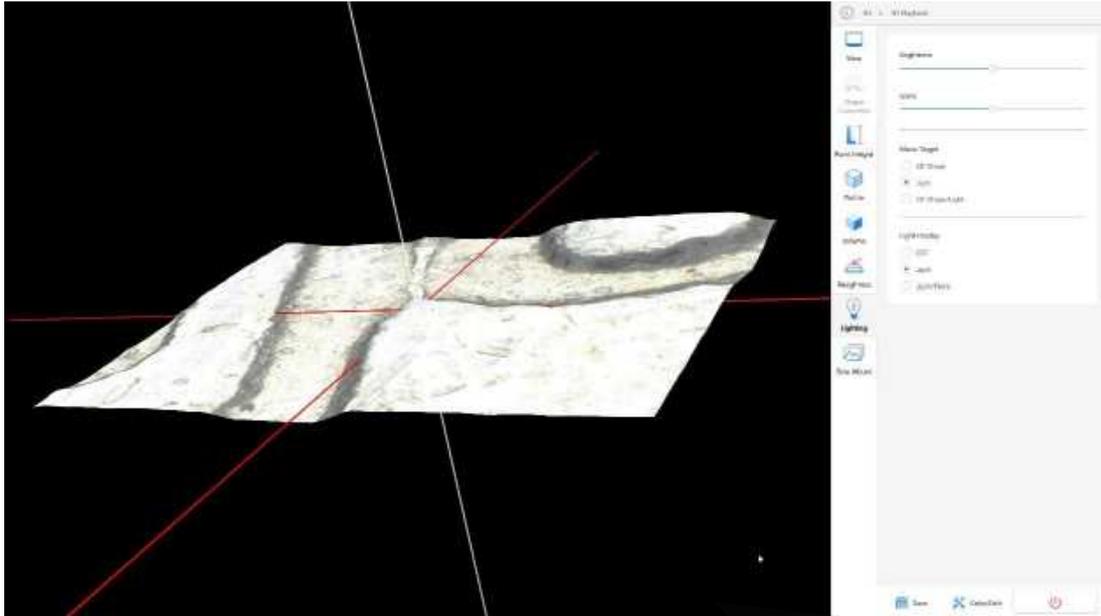
## 7.8 Lighting Simulation

Applying virtual lighting to a 3D model allows modifying its visual rendering effects by adjusting the illumination direction or intensity.

### 7.8.1 Enable Virtual Lighting

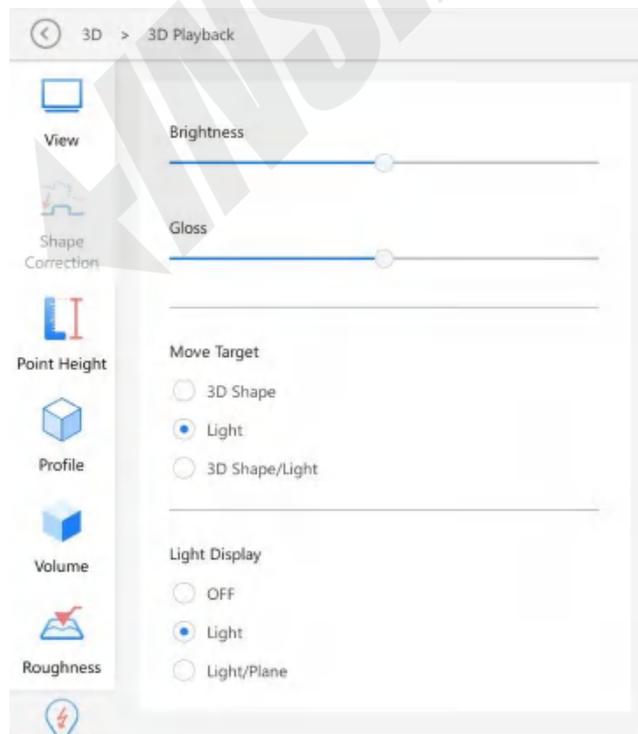
Example:

## 3D measuring microscope operating instructions



Display the light in the center of the image, and drag on the image to change the light or 3D model.

### 7.8.2 Virtual Lighting Settings



## 3D measuring microscope operating instructions

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ITEM	FUNCTION
BRIGHTNESS	Adjust Light Brightness with Slider
GLOSS	Adjust Gloss of 3D model with slider.
MOVE TARGET	Move only the observation target/Move only the light/Move observation target and the light simultaneously
LIGHT DISPLAY	Do not display/Display the irradiator line of the illumination light/Display the irradiator line and coordinate line of the illumination light

← ORIGINAL →

## Chapter 8 Stitching

Capture multiple images of the object by moving the XY stage automatically and stitch to get fine images beyond the normal captured field of view.

You can place the observation object on the XY stage and move it in the plane (XY) direction, and it starts capturing. The images can be stitched in 2D and 3D.

After registering stage position, you can move the XY stage to the registered position. Up to 99 stage positions can be registered.



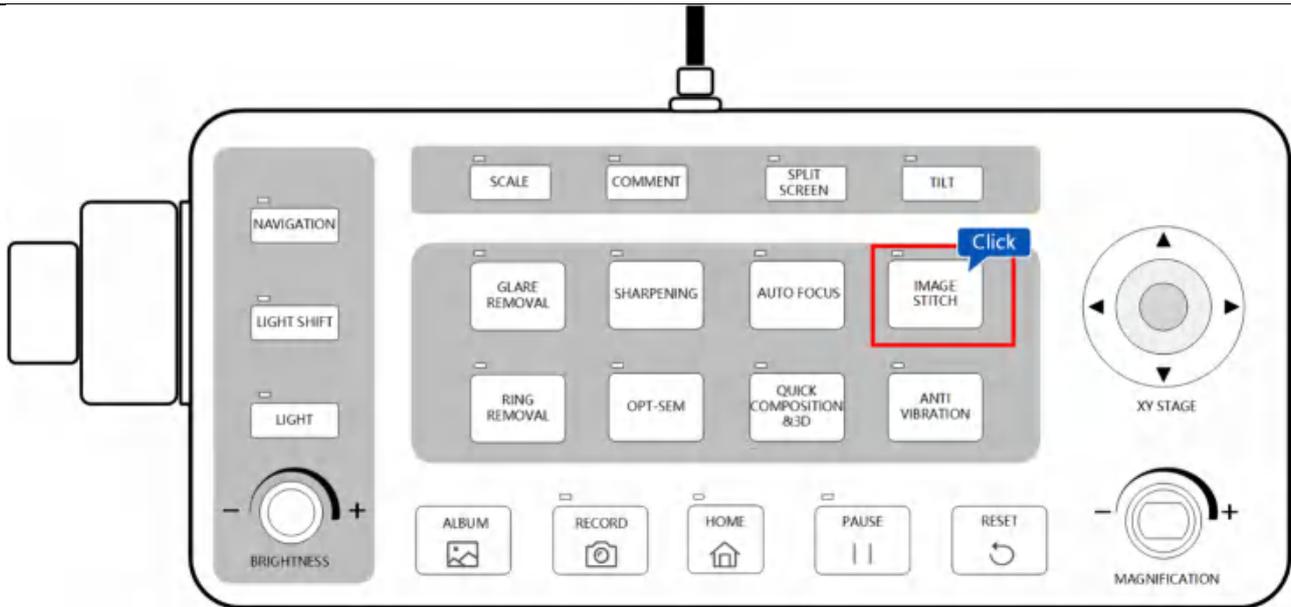
Stitching Settings

### 8.1 2D Image Stitching

2D Image Stitching: it can capture the images while automatically moving the XY stage to get the 2D large-sized image. The max. resolution for a single side of a 2D image is 150,000 pixels, and the total number of pixels can reach up to 5 billion.

● Console **Operation:**

Click the “IMAGE STITCH” button to enter the 2D image stitching configuration interface.



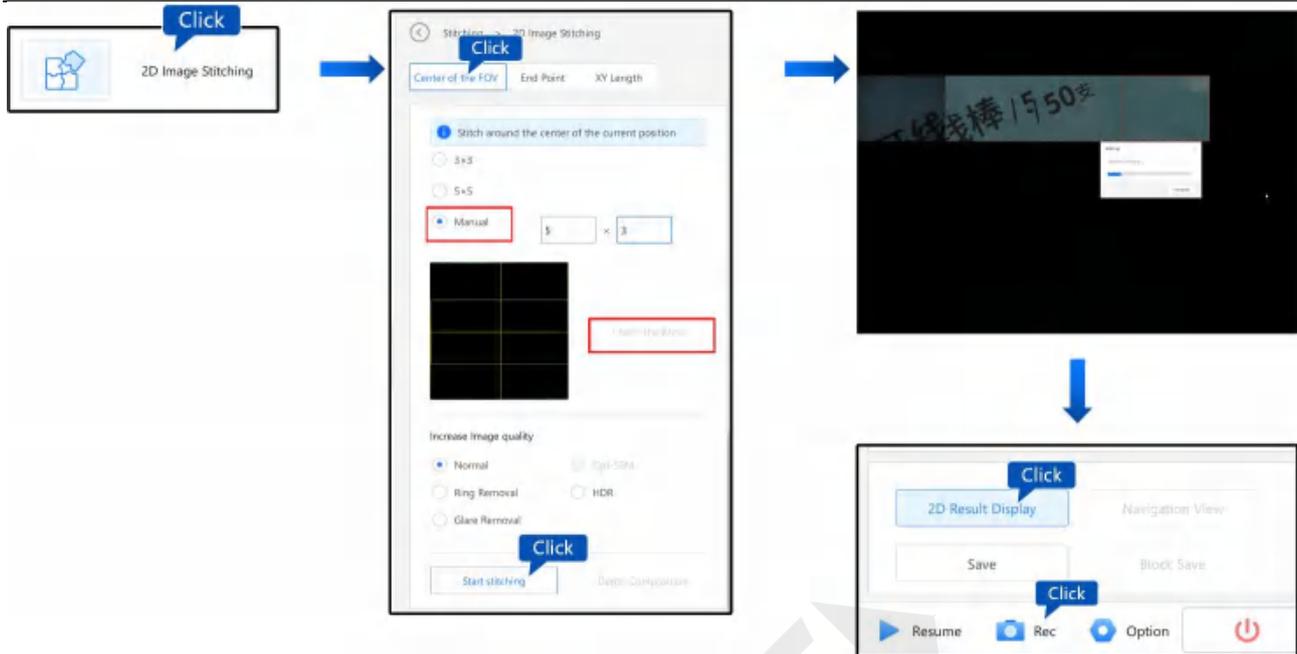
### 8.1.1 Center of FOV Stitching

Click to enter [2D Image Stitching], select the [Center of the FOV] tab, and stitch around the center of the current position.

Steps

1. Select the tab [Center of the FOV], and enter the center for stitching.
2. Select  $3 \times 3$ ,  $5 \times 5$  manually (manual input range is related to the resolution you set).
3. The default image is upgraded to [Normal]. You can select [Opt-SEM], [Ring Removal], [HDR], and [Glare Removal].
4. Click [Start Stitching] to stitch. Click [End] to stop stitching.
5. After stitching, you can enter [2D Result Display] by default. Click [Save]/[Rec] to save 2D image stitching result.

	2D Image Stitching Manual Input Range		
Resolution	Single Side Input X Limit	Single Side Input Y Limit	Total Number Input
<b>High Resolution (4000 × 3000)</b>	51	63	804
<b>Normal (2880 × 2160)</b>	70	93	1605
<b>High-Speed (2048 × 1536)</b>	102	129	3290



2D Image Stitching (View Center) Process

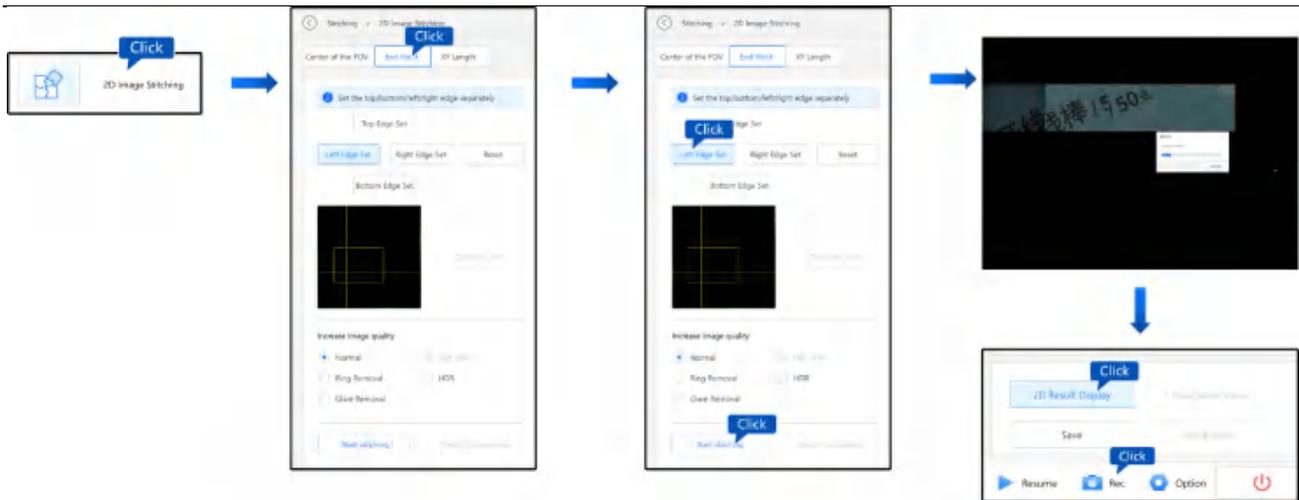
### 8.1.2 End Point Stitching

Click to enter [2D Image Stitching], and select [End Point] tab. The stitching contains rectangle range of the specified position.

Steps

1. Click the [End Point] tab, and move the XY stage through the Console/live image interface to the position that you want to put in the stitching range. Click [Top Edge Set], [Left Edge Set], [Right Edge Set], and [Bottom Edge Set] to set the edge separately.
2. Click [Reset] to set the end point again.
3. The default image is upgraded to [Normal]. You can select [Opt-SEM], [Ring Removal], [HDR], and [Glare Removal Reflection].
4. Click [Start Stitching] to start 2D image stitching. Click [End] to stop stitching.
5. After stitching, you can enter [2D Result Display] by default. Click [Save]/[Rec] to save 2D image stitching result.

## 3D measuring microscope operating instructions



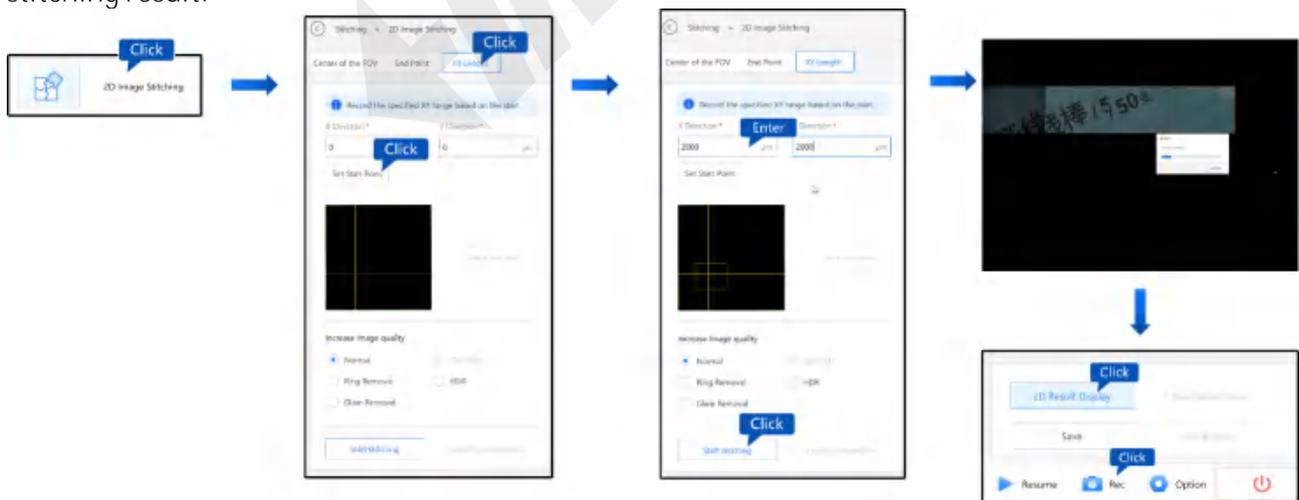
2D Image Stitching (End Point) Process

### 8.1.3 XY Length

Click to enter [2D Image Stitching], and select the [XY Length] tab. Use XY to specify the distance range for stitching.

Steps

1. Click [XY Length] tab, and click [Set Start Point]. The upper left of the specified field of view will be set as the start point. Specify the X direction and Y direction from the position.
2. Enter length in X direction and Y direction. Length range:  $-700000 \mu\text{m}$  to  $700000 \mu\text{m}$ .
3. The default image is upgraded to [Normal]. You can select [Opt-SEM], [Ring Removal], [HDR], and [Glare Removal].
4. Click [Start Stitching] to stitch, and click [End] to stop stitching.
5. After stitching, you can enter [2D Result Display] by default. Click [Save]/[Rec] to save 2D image stitching result.



XY Length 2D Image Stitching Process

## 8.2 3D Image Stitching

3D Image Stitching: 3D large-sized image can be obtained by automatically moving XY stage and importing 3D composite image to stitch. The max. resolution for a single side is 50,000 pixels, and the total number of pixels can reach up to 2.5 billion.

3D image stitching also supports the tabs [Center of the FoV], [End Point], and [XY Length]. The settings are basically the same as those of 2D image stitching.

### 8.2.1 Center of FOV Stitching

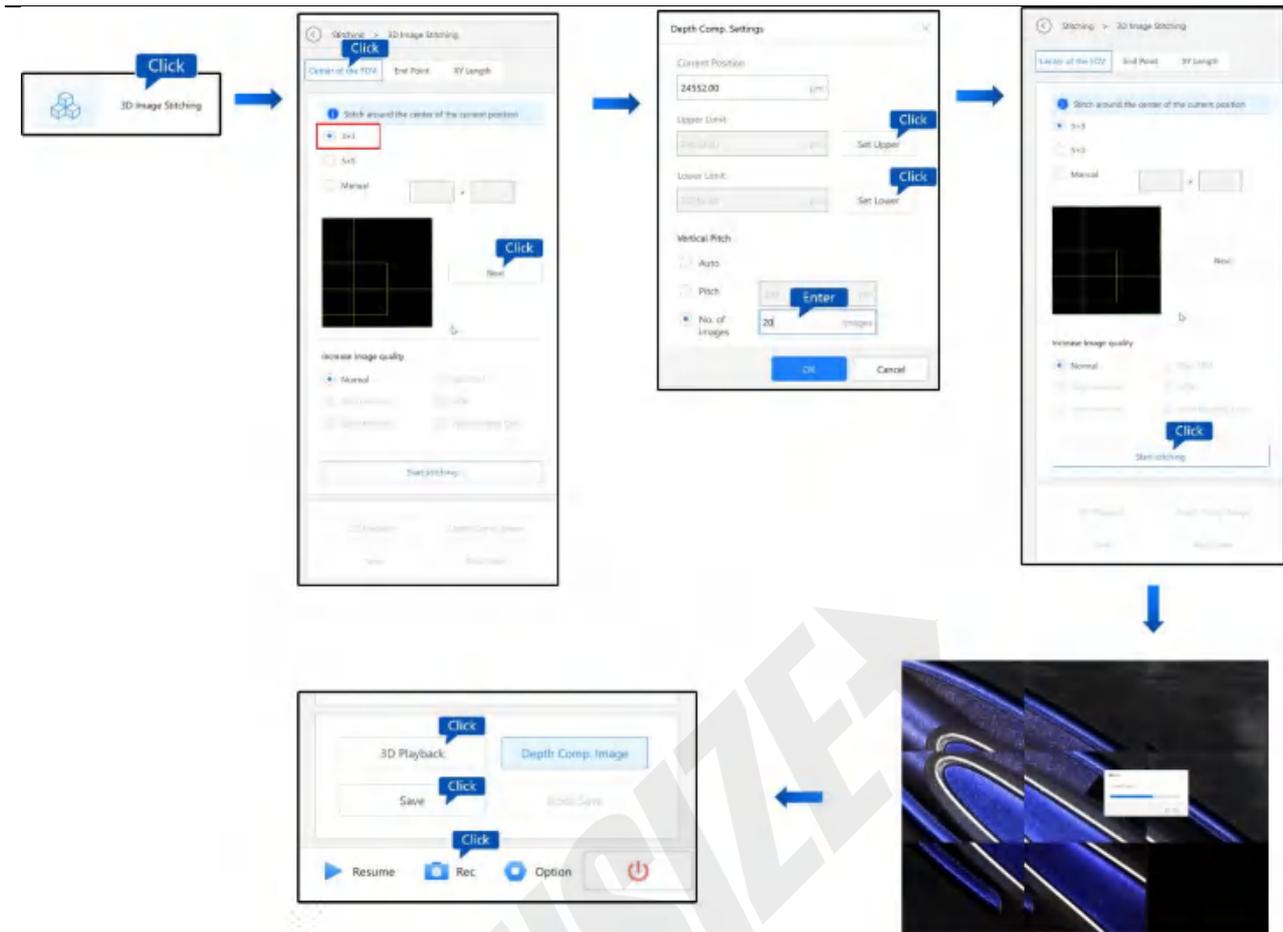
Click to enter [3D Image Stitching], select the [Center of the FOV] tab, and stitch around the center of the current position.

Steps

1. Select the tab [Center of the FOV], and enter the center for stitching.
2. Select  $3 \times 3$ ,  $5 \times 5$  manually (manual input range is related to the resolution you set).the center joint.
3. Click [Next] to go to [Depth Comp. Settings]: Move and focus Z axis, and click [Set Upper] and [Set Lower].
4. **Select [Auto] by default. Select “Pitch” and “No. of Images” and click “OK” to close the pop-up window. Note: Range of No. of images: 5 to 200. Pitch: 0.1 to 9999  $\mu\text{m}$ .**
5. Click [Start Stitching] to stitch, and click [End] to stop stitching.
6. After stitching, you can enter [Depth Comp. Image] by default. Click [Save] to save 3D result, and Click [Rec] to save 2D depth comp. image result.
7. Click [3D Playback] to enter the 3D measurement module.

	3D Image Stitching Manual Input Range		
Resolution	Single Side Input X Limit	Single Side Input Y Limit	Total Number Input
High Resolution (4000 × 3000)	17	21	357
Normal (2880 × 2160)	23	31	713
High-Speed (2048 × 1536)	34	43	1462

## 3D measuring microscope operating instructions



3D Image Stitching Process

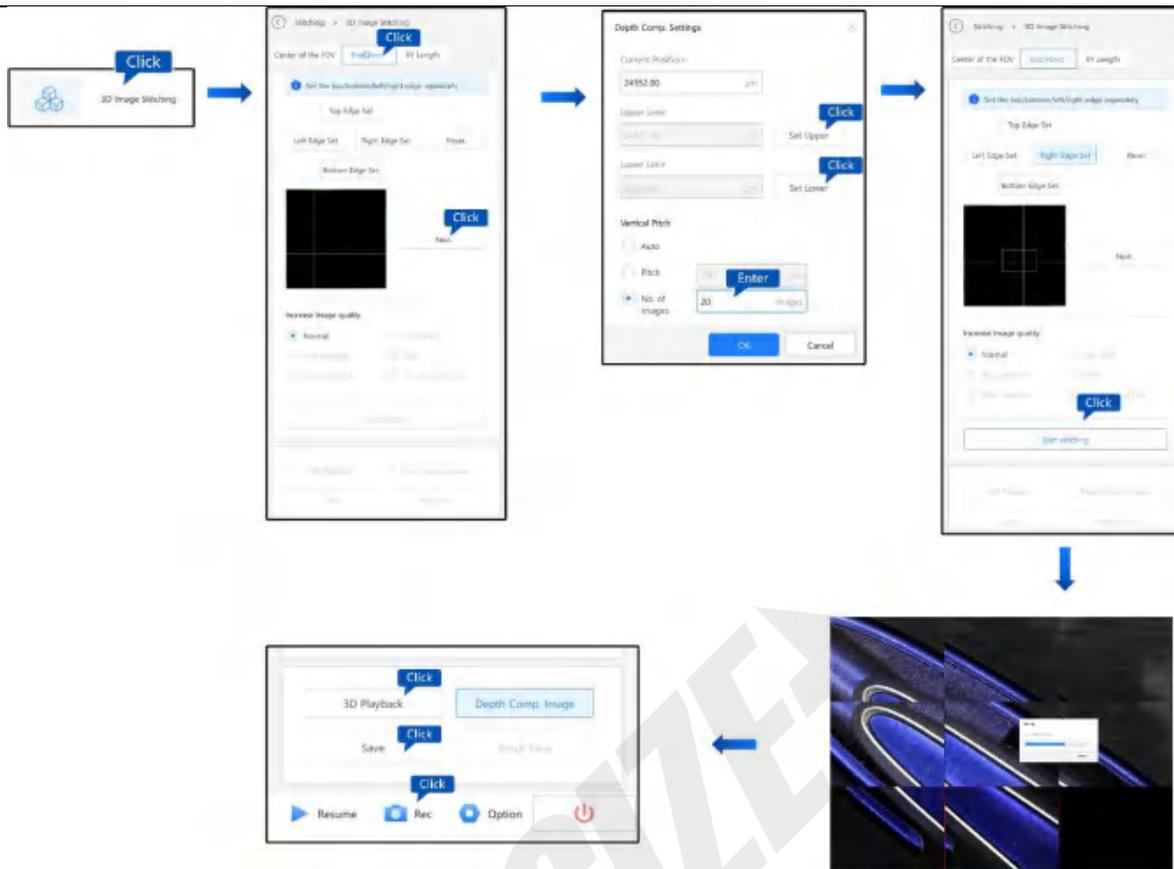
### 8.2.2 End Point Stitching

Click to enter 3D image stitching. Select the [End Point] tab, and the stitching will contain the rectangle range of the specified position.

Steps

1. Click the [End Point] tab, and move the XY stage through the Console/live image interface to the position that you want to put in the stitching range. Click [Top Edge Set], [Left Edge Set], [Right Edge Set], and [Bottom Edge Set] to set the edge separately.
2. Click [Reset] to set the end point again.
3. Click [Next] to go to [Depth Comp. Settings]: Move and focus Z axis, and click [Set Upper] and [Set Lower]
4. Select [Auto] by default. Select "Pitch" and "No. of Images" and click "OK" to close the pop-up window. Note: Range of No. of images: 5 to 200. Pitch: 0.1 to 9999  $\mu\text{m}$ .
5. Click [Start Stitching] to stitch, and click [End] to stop stitching.
6. After stitching, you can enter [Depth Comp. Image] by default. Click [Save] to save 3D result, and Click [Rec] to save 2D depth comp. image result.
7. Click [3D Playback] to enter the 3D measurement module.

## 3D measuring microscope operating instructions



3D Image Stitching (End Point) Process

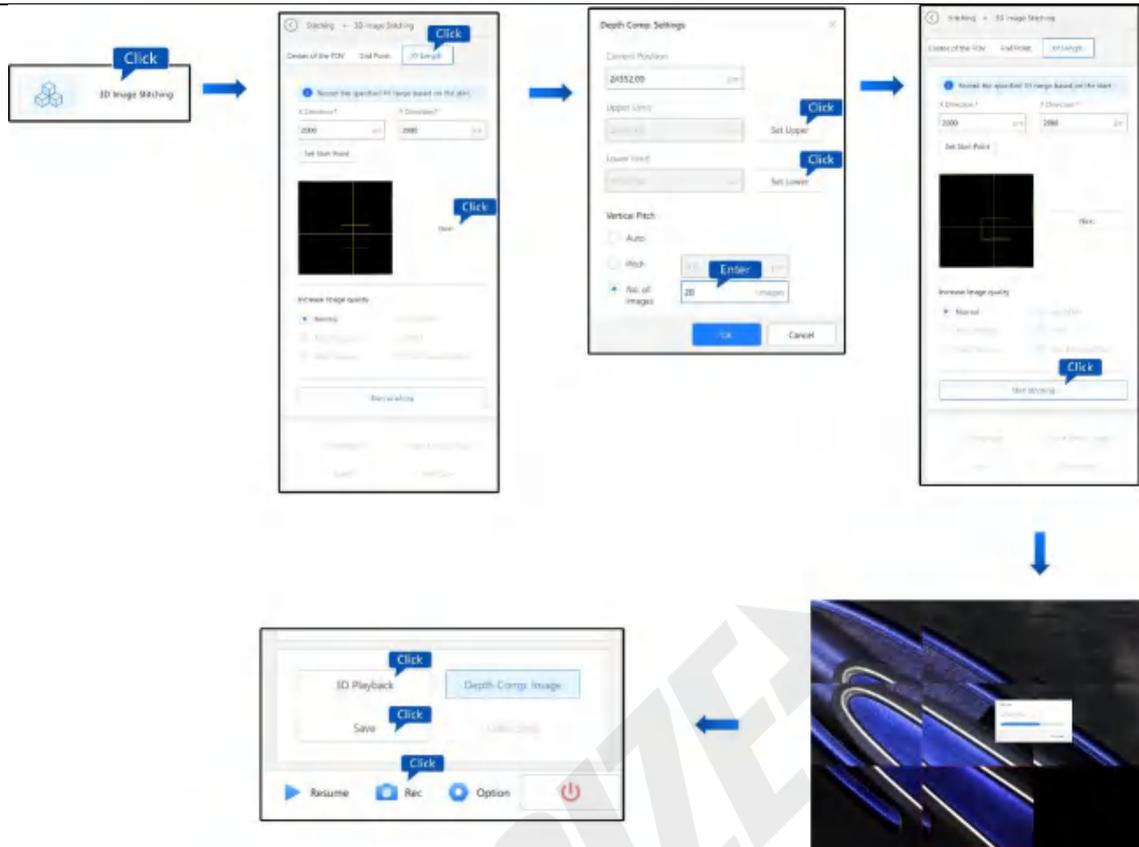
### 8.2.3 XY Length

Click to enter [3D Image Stitching], and select the [XY Length] tab. Use XY to specify the distance range for stitching.

Steps

1. Click [XY Length] tab, and click [Set Start Point]. The upper left of the specified field of view will be set as the start point. Specify the X direction and Y direction from the position.
2. Enter length in X direction and Y direction. Length range:  $-700000 \mu\text{m}$  to  $700000 \mu\text{m}$ .
3. Click [Next] to go to [Depth Comp. Settings]: Move and focus Z axis, and click [Set Upper] and [Set Lower]
4. Select [Auto] by default. Select "Pitch" and "No. of Images" and click "OK" to close the pop-up window. Note: Range of No. of images: 5 to 200. Pitch:  $0.1$  to  $9999 \mu\text{m}$ .
5. Click [Start Stitching] to stitch, and click [End] to stop stitching.
6. After stitching, you can enter [Depth Comp. Image] by default. Click [Save] to save 3D result, and Click [Rec] to save 2D depth comp. image result.
7. Click [3D Playback] to enter the 3D measurement module.

## 3D measuring microscope operating instructions



3D Image Stitching (XY Length) Process

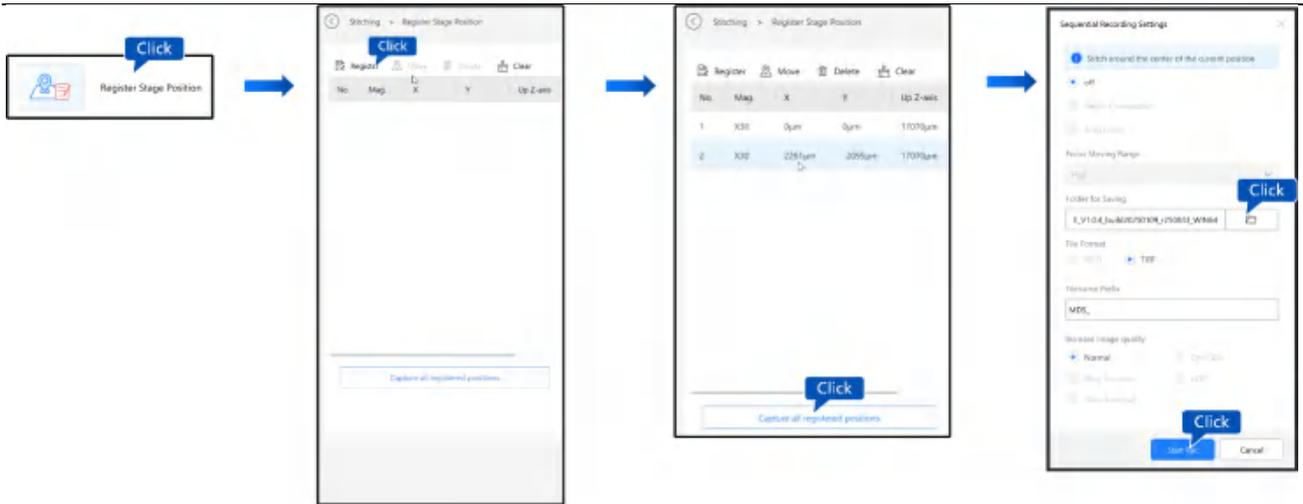
### 8.3 Register Stage Position

You can register the position of the XY stage, the position of up Z-axis and down Z-axis. You can quickly move the XY stage, up Z-axis, and down Z-axis to the register position. Up to 99 stage positions can be registered.

Steps

1. Click [Register Stage Position] and move to register position by moving the Console/live image.
2. Click [Register] to register the stage and Z axis position (magnification, X axis, Y axis, up Z-axis and down Z-axis).
3. Click [Move] to move the stage and Z axis position (magnification, X axis, Y axis, up Z-axis and down Z-axis) to the position selected in the list.
4. Click [Delete] to delete the selected position from the list.
5. Click [Clear] to clear all registration positions.
6. Click [Capture all registered positions], and select the image [Folder for Saving] in pop-up window, and edit [Filename Prefix].
7. Click [Start Rec] to capture and save the image at all the positions registered in the list.

# 3D measuring microscope operating instructions



Register Stage Position



## Chapter 9 Measurement

On the still image or image in the album, you can use different measurement functions to measure parameters such as required length, angle, area, or grain count on the feature samples.

### 9.1 Plane Measurement

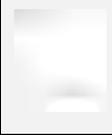
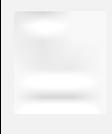
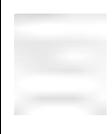
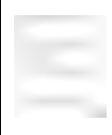
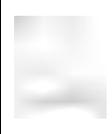
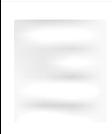
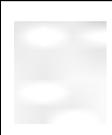
#### 9.1.1 Type Overview

Main Measurement

Measure parameters such as distance and angle.



## 3D measuring microscope operating instructions

ITEM	FUNCTION
	Measure the distance between any specified two points.
	Measure the radius of the circle formed by any specified three points.
	Measure the diameter of the circle formed by any specified three points.
	Measure the interior angle formed by any specified three points. The three points refer to two boundary points and one vertex.
	Measure the angle formed by two straight lines crossing each other.
	Measure the distance between any specified reference line and line.
	Measure the center-to-center distance between any two specified circles.
	Measure the distance between any specified reference line and its parallel.
	Measure the distance between any specified reference line and point.
	Measure the accumulated distance between any specified multi-point.
	Measure the accumulated distance between start point and end point of any specified curve.

## 3D measuring microscope operating instructions

	Measure the RGB value of any specified point.
	Measure the accumulated number of measurements in the specified measurement point.
	Measure the lengths of sides and diagonal of the rectangle formed by any specified XY with four lines.
	Delete the specified main measurement data displayed on the image.
	Delete all the main measurement data on the image.

### Measure Area

Measure the area of the specified area.

- Specifying Shape

ITEM	FUNCTION
	Draw a polygon area in any multi-point for measuring area.
	Draw a circle area in any specified three points for measuring area.
	Draw a free-shaped area in any curve for measuring area.
	Draw a rectangular area in any two points for measuring area.

- Specifying **Brightness** or **Color**

ITEM	FUNCTION
	Extract the area with the same brightness level as the specified point on the image to generate binary image for measuring area.
	Extract the area with the same color level as the specified point on the image to generate binary image for measuring area.
	After extracting by brightness and color to generate binary image, all areas below the threshold will be eliminated and set to non-extraction status.
	After extracting by brightness and color to generate binary image, all areas below the threshold will be filled and set to extraction status.

- Measuring Area & Deleting Area

ITEM	FUNCTION
	Select a drawn or extracted area to measure its area.
	Delete the measured area value of specified area or the drawn/extracted area on the image.
	Delete the measured area value of all areas and the drawn/extracted area on the image.

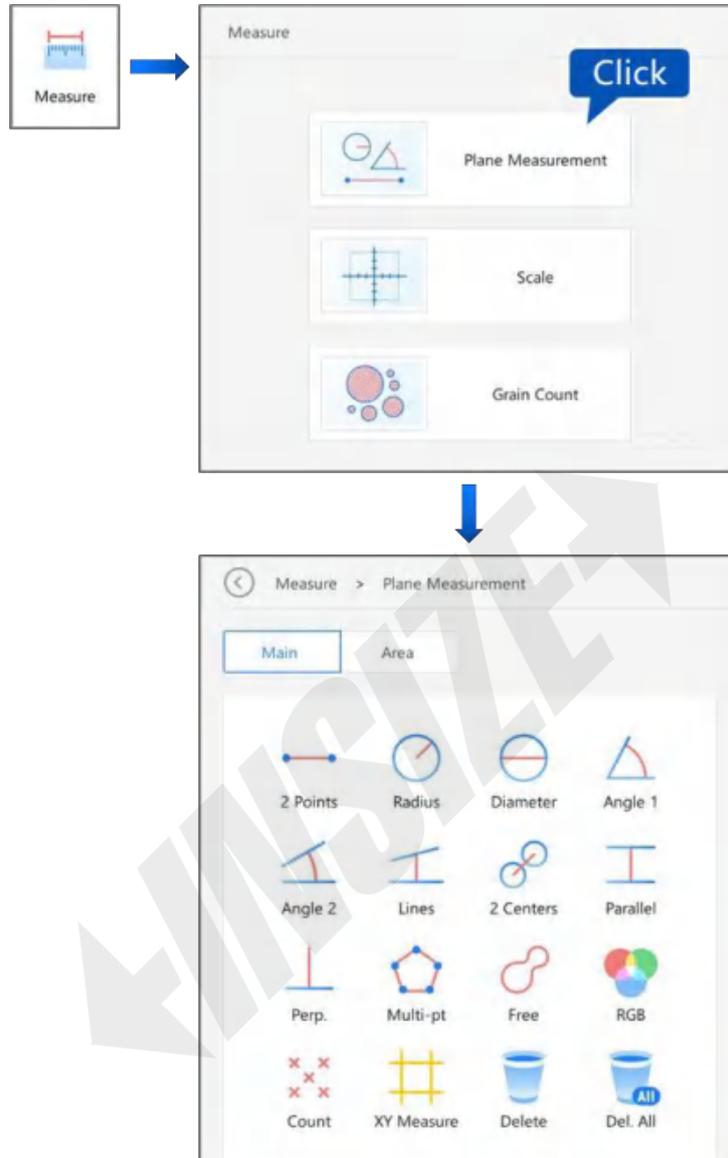
### 9.1.2 Main Measurement

On the still image or image in the album, you can measure parameters such as length, angle, and object count of the specified measurement point. The measurement data can be displayed on the image, or in Meas. Result Window, and saved in CSV format.

## 3D measuring microscope operating instructions

### Measure Steps

1. Click Measure to enter the measurement interface, and Plane Measurement to enter the plane measurement interface.



2. Select Main, and click the icon of the required measurement Item.

After the measurement Item is selected, the icon turns to the selected status, which is highlighted in a light blue color. After clicking the selected icon again, it returns to the unselected status.



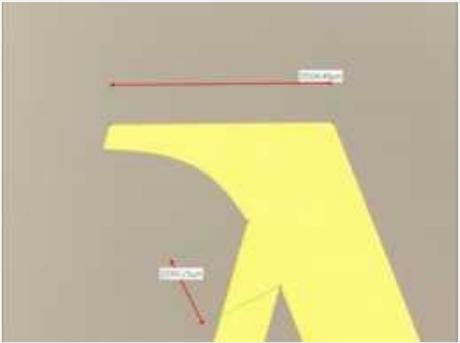
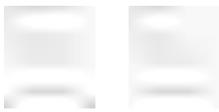
### Note

After clicking Plane Measurement, the video stream window will be changed to paused status. Playing cannot be enabled during the measurement process. You should exit the plane measurement interface to enable video stream.

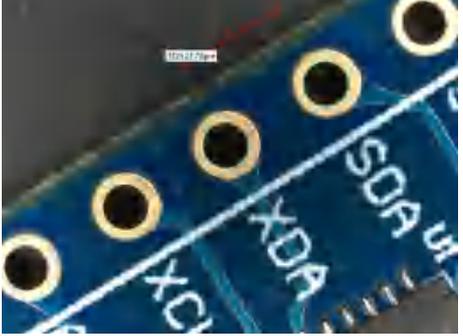
3. Measure the specified measurement point on the image.
  - For detailed operation process of each measurement Item, please refer to the Steps of Each Measurement Item in this chapter.
  - Measurement data is displayed on the measurement window by default. Please refer to Display Settings in this chapter.
  - To display the measurement results in the measurement window, refer to Display Settings in this chapter.
  - To save the picture with measurement results, click [Rec] to save.

### Steps of Each Measurement Item

## 3D measuring microscope operating instructions

ITEM	STEP	EXAMPLE
	<ol style="list-style-type: none"> <li>1. Click start point and end point in sequence.</li> <li>2. Display the line and distance value between the two points.</li> <li>3. Click to place the measurement data.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Click three specified points in sequence to determine the circle pattern.</li> <li>2. Display the radius/diameter value of the circle.</li> <li>3. Click to place the measurement data.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Click the point on the angle edge 1.</li> <li>2. Click the point on angle edge 2.</li> <li>3. Click the point of the angle vertex.</li> <li>4. Display the angle determine by the three points above, and display the angle value.</li> <li>5. Click to place the measurement data.</li> </ol>	

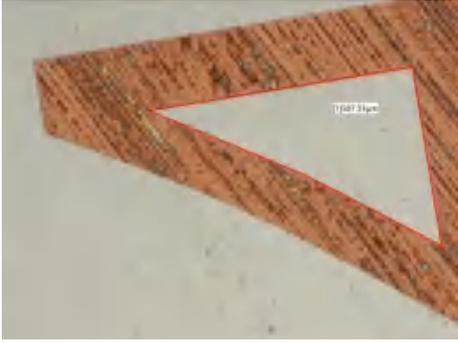
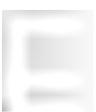
## 3D measuring microscope operating instructions

	<ol style="list-style-type: none"> <li>1. Click two specified points in sequence to determine reference line.</li> <li>2. Click two specified points in sequence to determine the measurement line.</li> <li>3. Display the distance between the measurement line and the reference line.</li> <li>4. Click to place the measurement data.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Click two specified points in sequence to determine the reference line.</li> <li>2. Click two specified points in sequence to determine the measurement line.</li> <li>3. Display the distance between the measurement line and the reference line.</li> <li>4. Click to place the measurement data.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Click three specified points in sequence to determine the circle pattern 1.</li> <li>2. Click three specified points in sequence to determine the circle pattern 2.</li> <li>3. Display the center distance between circle pattern 1 and</li> <li>4. Click to place the measurement data.</li> </ol>	

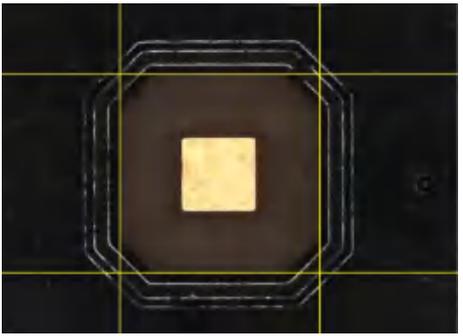
## 3D measuring microscope operating instructions

	<ol style="list-style-type: none"> <li>1. Click two specified points in sequence to determine the reference line.</li> <li>2. Click one specified point to determine the parallel line.</li> <li>3. Display the distance value between the parallel line and the reference line.</li> <li>4. Double-click to place the measurement data.</li> </ol> <p>Note: You can use the same reference line to measure the distance of multiple parallel lines. Click End to finish the single measurement, and double-click End to finish the measurement of the reference line.</p>	
	<ol style="list-style-type: none"> <li>1. Click two specified points in sequence to determine the reference line.</li> <li>2. Click one specified point to determine the perp. end point.</li> <li>3. Display the distance value of measurement perp.</li> <li>4. Click to place the measurement data.</li> </ol> <p>Note: You can use the same reference line to measure the distance of multiple perp. Click End to finish the single measurement, and double-click End to finish the measurement of the reference line.</p>	

## 3D measuring microscope operating instructions

	<ol style="list-style-type: none"> <li>1. Click the specified start point and channel point in sequence. Double click end point to finish.</li> <li>2. Display the accumulated distance between multiple points.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Long press and drag the mouse to draw the curve.</li> <li>2. Release long press to finish the measurement, and display the accumulated curve length.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Click the specified point.</li> <li>2. Display the RGB value of the measurement point.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Click the measurement point to count in sequence.</li> <li>2. Display the symbol "x" in corresponding position after each click.</li> <li>3. Display the counting value in Meas. Result window.</li> </ol>	

## 3D measuring microscope operating instructions

	<ol style="list-style-type: none"> <li>1. Select one of four XY lines and drag it to the specified position.</li> <li>2. Display XY edge length and angle D length of the middle rectangle in Meas. Result window.</li> </ol>	
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 **Note**

- Click not specified in the table means left-click.
- Click the right mouse button to start a step backward.

### Editing and Deleting Measurement Data

 **Note**

After the measurement Item is selected, the icon turns to the selected status, and editing the measurement data is not allowed. Click the icon again to cancel the selected status.

ITEM	STEP
EDIT DATA POSITION	Long press and drag the data to the specified position.
EDIT POSITION OF MEASUREMENT POINT, LINE, OR CIRCLE.	Long press and drag the measurement point, line, or circle to the specified position.

ITEM	STEP
	<ol style="list-style-type: none"> <li>1. Click Delete to change it to selected status.</li> <li>2. Click main measurement test data to delete.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Click Delete All, and delete confirmation dialog box pops up.</li> <li>2. Click OK to delete all main measurement test data.</li> </ol>

## 3D measuring microscope operating instructions

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### Display Settings

Set the display mode of measurement data.

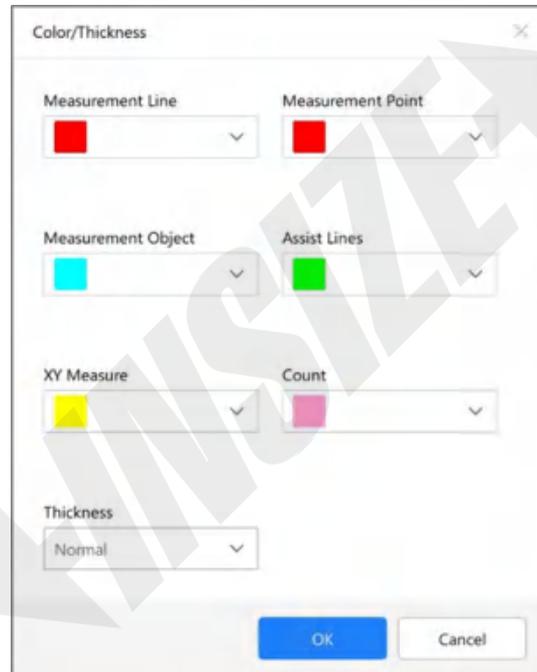


- **Display Meas. Value**

Select to display image measurement data. It will be displayed by default.

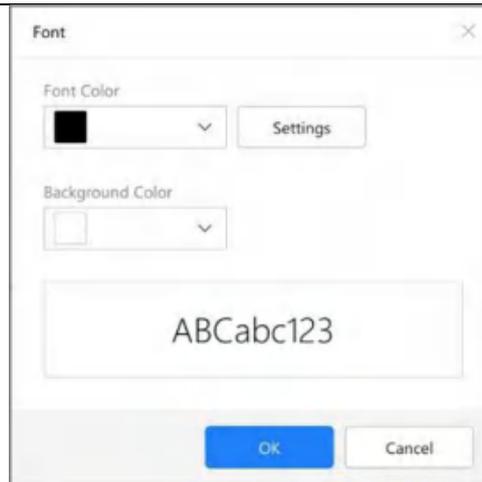
- **Color/Thickness**

Set the color and thickness of the measurement line and assist line. After changing the color, click OK to finish the setting.



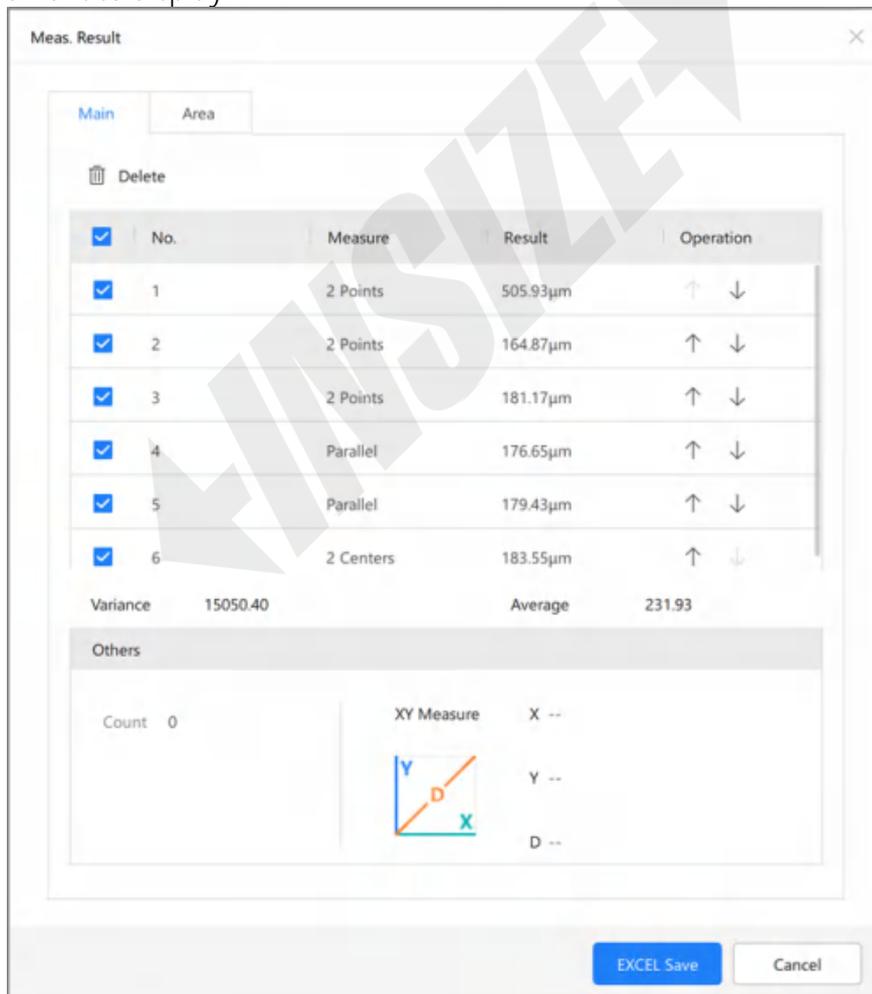
- **Font**

Set the color, font, and background color of the measurement data, and click OK to finish setting.



### ● Meas. Result

After clicking Meas. Result, Meas. Result Window will pop up. You can select the measurement data of main measurement to display.



## 3D measuring microscope operating instructions

ITEM	FUNCTION
NO.	No. tag of the measurement data on the image.
MEASURE	Measurement Item name.
RESULT	Measurement data value.
 OPERATION	Move the No. of the measurement data up and down, and the No. on the image window will change accordingly.
VARIANCE	The value obtained by calculating the variance of the Result value of the selected length and angle when the checkbox before No. is selected.
AVERAGE	The value obtained by calculating the average of the Result value of the selected length and angle when the checkbox before No. is selected.
COUNT	The counting quantity displayed when measurement Item Count is used.
XY MEASURE	The XY edge length and angle D length of the middle rectangle displayed when measurement Item XY Measure is used.
EXCEL SAVE	Save the main measurement data as EXCEL file.
DELETE	When the checkbox before No. is selected, the Delete button is enabled (disabled if not selected), and the corresponding measurement result will be deleted.

### Auxiliary Function

- Edge Detection

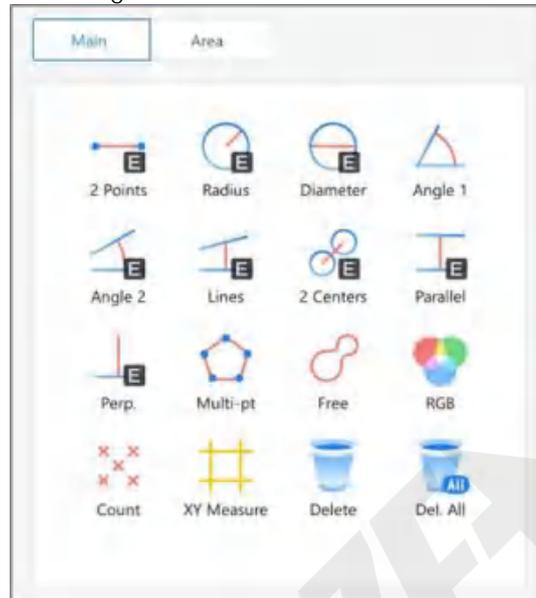
Detect the edge of the measurement object, and auto correct the measurement points and lines to minimize the error of manual measurement



### Steps

1. Select Edge Detection in Auxiliary Functions.

"E" will appear in the lower-right corner of the test Item icons of 2 Points, Radius, Diameter, Lines, 2 Circles, Parallel, and Perp., meaning that the test Items have the function of edge detection.

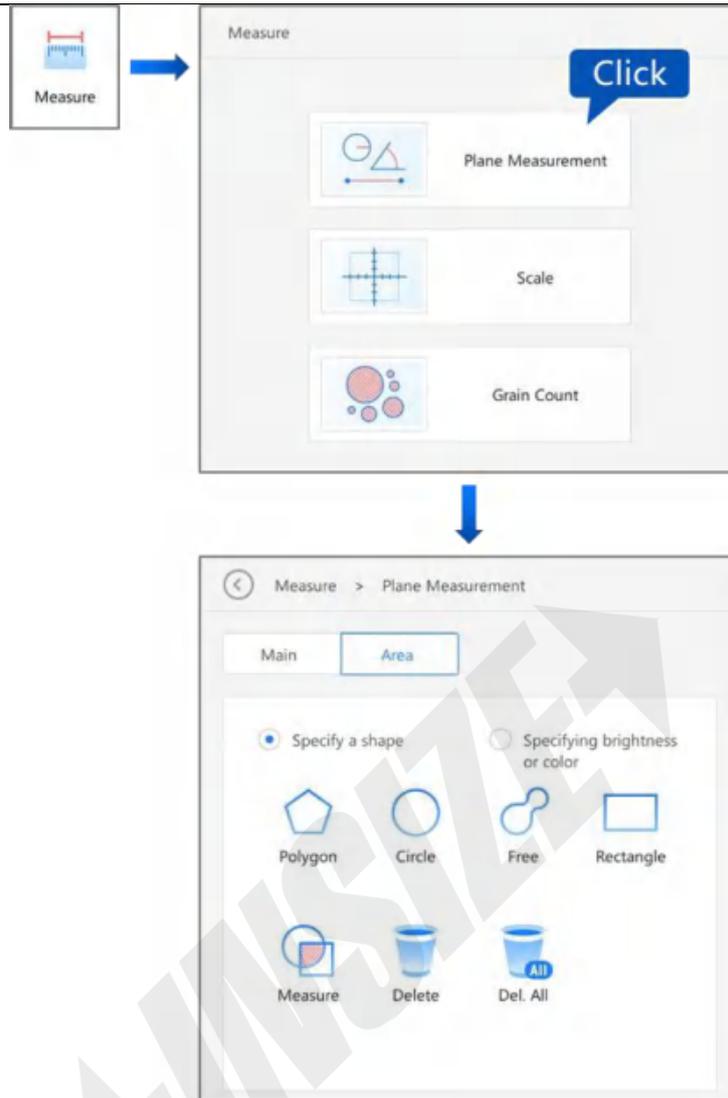


2. According to the test Item steps, draw a point or line around the test object. The point or line will be automatically adsorbed to the boundary point or line that is recognized in the width range. You can change the detection range by changing the Width value.

### 9.1.3 Measuring Area

#### Measuring Steps

1. Click Measure to enter the measurement interface, and Plane Measurement to enter the plane measurement interface.

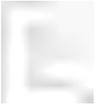
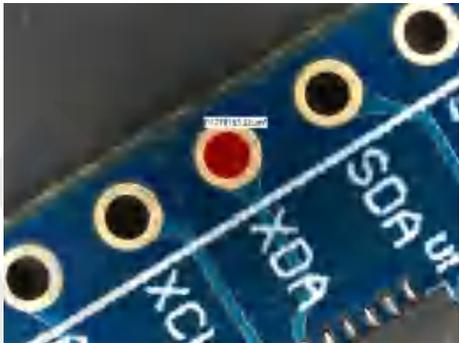
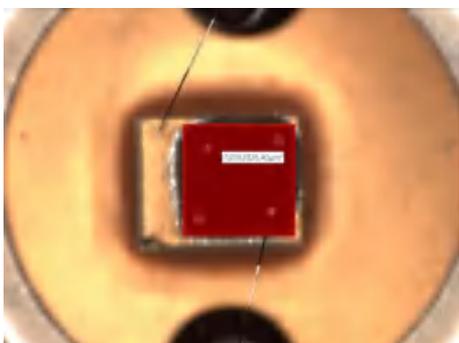


2. Select Area, and click the icon of the required measurement Item.  
After the measurement Item is selected, the icon turns to the selected status, which is highlighted in a light blue color. After clicking the selected icon again, it returns to the unselected status (see Main for icon changing style).
3. Measure the specified measurement point on the image. The measurement methods are Specifying a Shape and Specifying Brightness and Color.  
Use different measurement Items to draw and extract area. Click Measure after area selection to set it Measure in the selected status. Click the area to measure again to complete the measurement.  
Measurement data is displayed on the measurement window by default. Please refer to Display Settings in this chapter.  
To display the measurement results in the measurement window, refer to Display Settings in this chapter.  
To save the picture with measurement results, click Record to save.

### Steps of Each Measurement Item

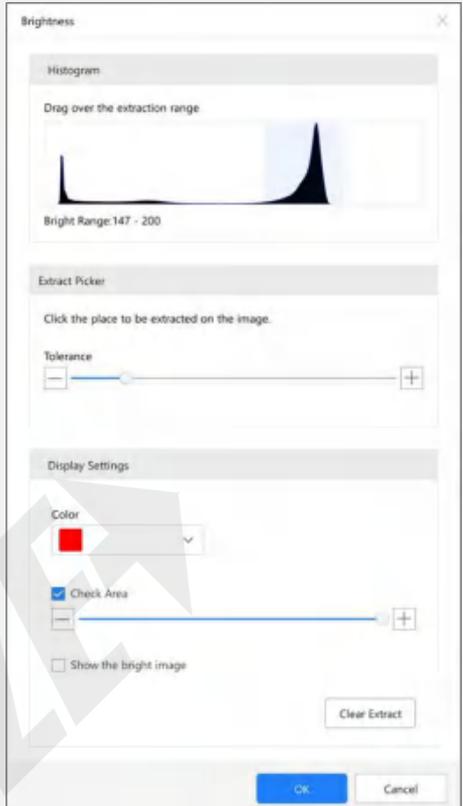
- Specifying a Shape

## 3D measuring microscope operating instructions

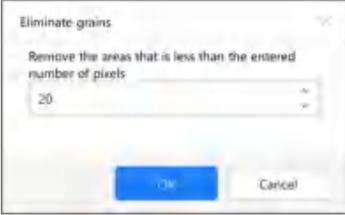
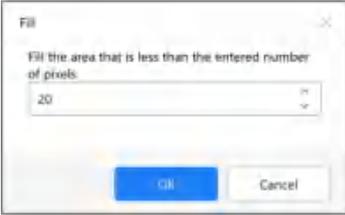
ITEM	STEP	EXAMPLE
	<ol style="list-style-type: none"> <li>1. Click the specified start point and channel point in sequence.</li> <li>2. Double-click the end point to finish drawing polygon area.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Click the specified three points in sequence to determine the circle area.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Long press and drag the mouse to draw the curve.</li> <li>2. Release long press to finish drawing the curve area.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Click the upper left vertex and lower right vertex of the specified rectangle in sequence.</li> <li>2. Finish drawing the rectangular area.</li> </ol>	

- Specifying Brightness and Color

### 3D measuring microscope operating instructions

ITEM	STEP	SET SIGNAL
	<ol style="list-style-type: none"> <li>1. Display Color window.</li> <li>2. Click the image target color to select in multiple areas consecutively.</li> <li>3. Check if the tolerance range of color is between 0 and 128, and the area within the color range will be selected.</li> <li>4. [Color] Set the display color of the selected area.</li> <li>5. [Check Area] Check if the selected area is suitable by dragging the selected area.</li> <li>6. [OK] Extract the area, and the image window will be changed to binary image. The white area is the selected area.</li> </ol> <p>Note: [Clear Extract] You can clear the selected area.</p>	

## 3D measuring microscope operating instructions

	<p>1 Display the Color Extraction window.</p> <p>2 Click image target color to select in consecutive areas.</p> <p>3 Check if the range of color drawing tolerance is between 0 and 128, and the area within the color range will be selected.</p> <p>4 [Color] Set the display color of the selected area.</p> <p>5 [Check Area] Check if the selected area is suitable by dragging the selected area.</p> <p>6 [OK] Draw area. The image window will be changed to monochrome, and the white area is selected.</p> <p>Note: [Clear Extract] You can clear the selected area.</p>	
	<p>After using the specified Brightness or Color, you can correct the selected area obtained. Manually enter the number of pixels, and the selected area less than it will be removed automatically.</p>	
	<p>After using the specified Brightness or Color, you can correct the selected area obtained. Manually enter the number of pixels, and the area less than it will be filled and set as the selected area.</p>	

### Note

- Click not specified in the table means left-click.
- Click the right mouse button to start a step backward.

### Measuring Data and Deleting Data

Measure area by drawing area first and then measuring area.

## 3D measuring microscope operating instructions

ITEM	STEP
	<ol style="list-style-type: none"><li>1. Click Measure after area selection, and change it to selected status.</li><li>2. Click the area to measure in sequence.</li></ol>
	<ol style="list-style-type: none"><li>1. Click Delete to change it to selected status.</li><li>2. Click the area measurement data or area to delete.</li></ol>
	<ol style="list-style-type: none"><li>1. Click Delete All, and delete confirmation dialog box pops up.</li><li>2. Click OK to delete all area measurement data and areas.</li></ol>

### Display Settings

Set the display mode of measurement data.

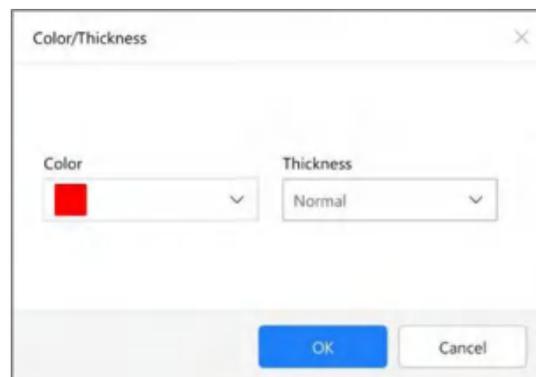


- **Display Meas. Value**

Select to display image measurement data. It will be displayed by default.

- **Color/Thickness**

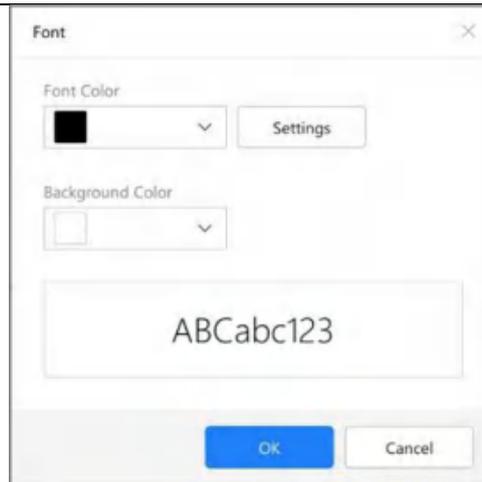
Set the color and thickness of the measurement line and assist line. After changing the color, click OK to finish the setting.



- **Font**

Set the color, font, and background color of the measurement data, and click OK to finish setting.

## 3D measuring microscope operating instructions



- Meas. Result

After clicking Meas. Result, Meas. Result Window will pop up. You can select the measurement data of main measurement to display.

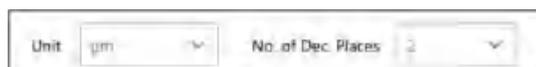


## 3D measuring microscope operating instructions

ITEM	FUNCTION
NO.	No. tag of the measurement data on the image.
AREA	Area of the area corresponding to the No.
PERIMETER	Perimeter of the area corresponding to the No.
VAR. OF AREA	The value obtained by calculating the variance of the Area value of the selected Item when the checkbox before No. is selected.
AVG. OF AREA	The value obtained by calculating the average of the Area value of the selected Item when the checkbox before No. is selected.
VAR. OF PERIMETER	The value obtained by calculating the variance of the Perimeter value of the selected Item when the checkbox before No. is selected.
AVG. OF PERIMETER	The value obtained by calculating the average of the Perimeter value of the selected Item when the checkbox before No. is selected.
COUNT	Number of measurement areas.
TOTAL AREA	Total area of the whole display areas.
SELECTED AREA	Total area of all specified areas.
AREA RATIO	The ratio of the selected area to the total area.
EXCEL SAVE	Save the measurement data as EXCEL file.

### 9.1.4 Unit and Number of Decimal Places

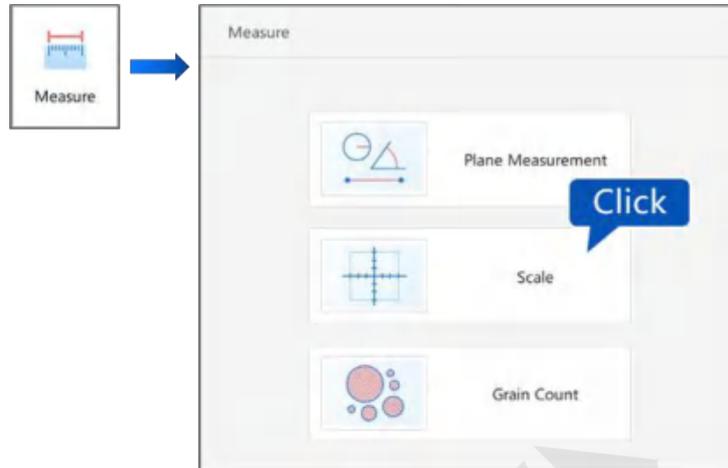
It is used to change the unit and number of decimal places displayed in the plane measurement result.



### 9.2 Scale

#### Steps

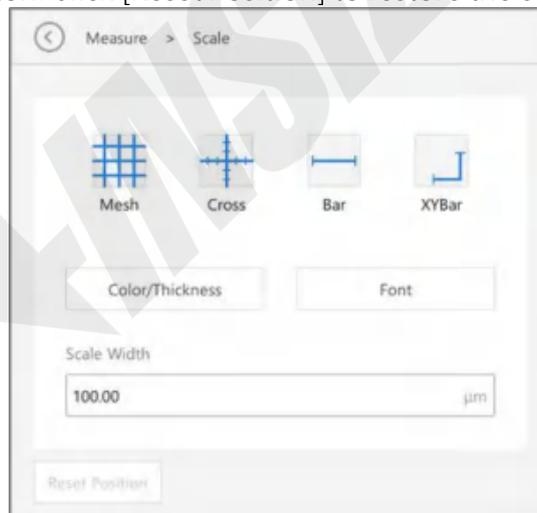
1. Click [Measure] to enter the measurement interface, and click [Scale] to enter the scale interface.



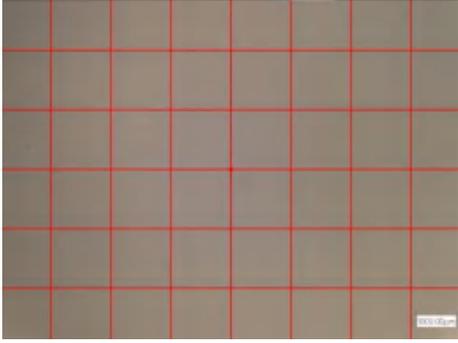
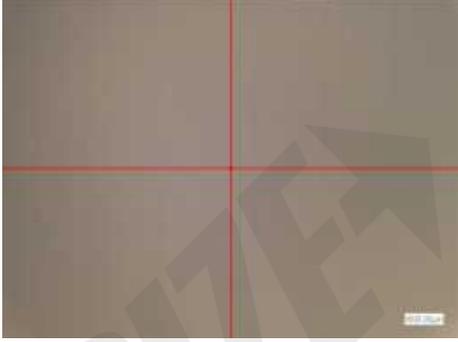
2. Select scale type.

After the scale is selected, the video stream will display the corresponding scale. You can drag the scale up, down, left, and right. After the scale is selected, the icon will be displayed as selected, and the window color will be light blue. Click the selected icon again to unselect the scale.

After the scale is enabled, the scale of the image window can be dragged to the desired position by pressing the left mouse button. Click [Reset Position] to restore the scale to the default position.



## 3D measuring microscope operating instructions

ITEM	EXAMPLE
	
	
	
	

3. Set scale unit width.  
Display scale and unit length in video stream.

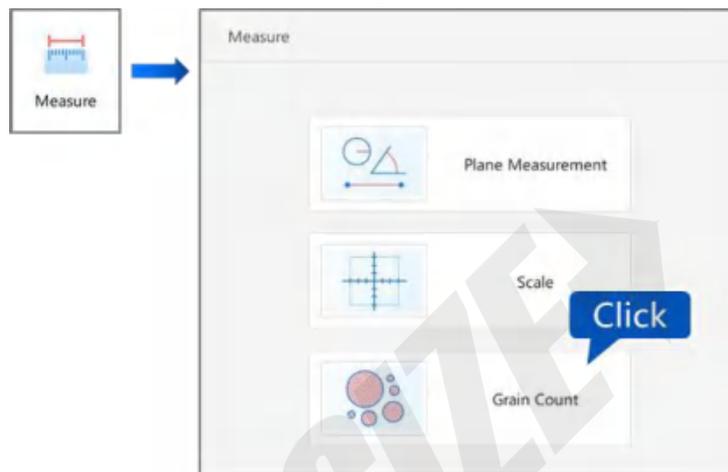
### 9.3 Grain Counting

Automatically extract areas with the same brightness or color level, measure the area of the object after adjusting the shape of the area, and save the data file of the area automatically measured.

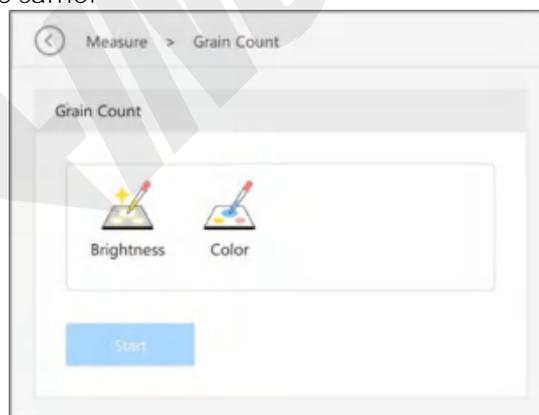
#### 9.3.1 Measurement Steps

Steps

1. Draw area to determine basic area range.
2. Click [Measure] and [Grain Count] to enter the grain count interface.

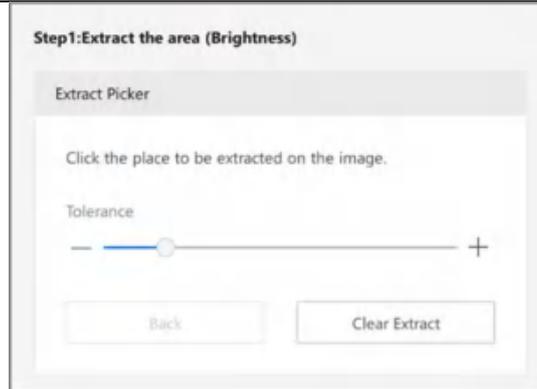


3. The grain counting function is divided into two types of extraction methods: [Brightness] and [Color]. Draw basic area. [Brightness] and [Color] only differ in basic extraction mode. The steps after basic extraction are the same.



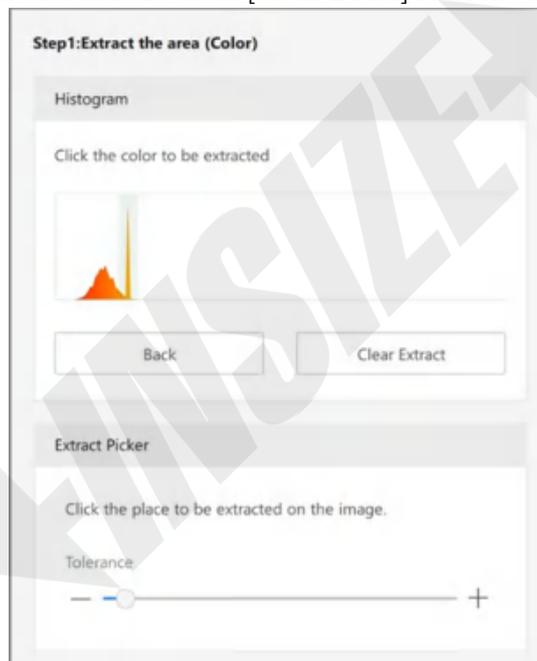
4. Extract Brightness:

**Click Start to enter the "Step 1: Extract the area (Brightness)" window.** Get the brightness value by clicking continuously on the image, and extract all the brightness areas within the tolerance range. The tolerance range can be adjusted by dragging progress bar. The range should be between 0 and 127. [Back] is used to select the area for the last time in a continuous click. [Clear Draw] is used to clear all the areas.



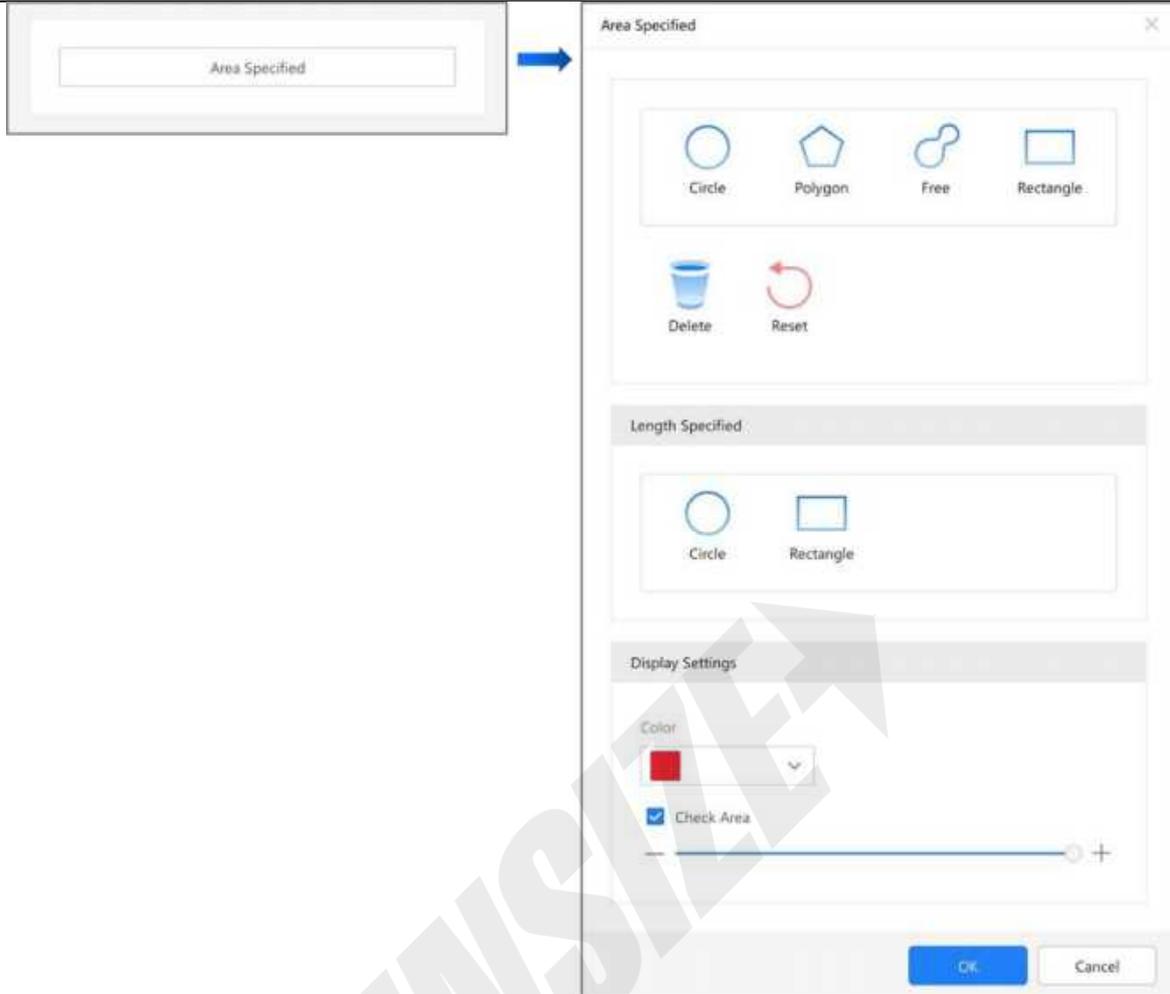
### 5. Extract Color

Click Start to enter the “Step 1: Extract the area (Color)”. Get the color value by clicking continuously on the image, and extract all the color areas within the tolerance range. The tolerance range can be adjusted by dragging progress bar. The range should be between 0 and 127. [Back] is used to select the area for the last time in a continuous click. [Clear Draw] is used to clear all the areas.



6. Draw a restricted area. If you need to extract an area in an area, click “Area Specified”.

## 3D measuring microscope operating instructions



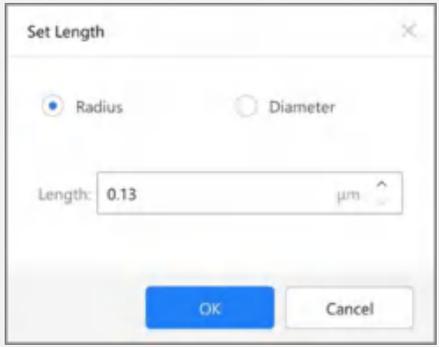
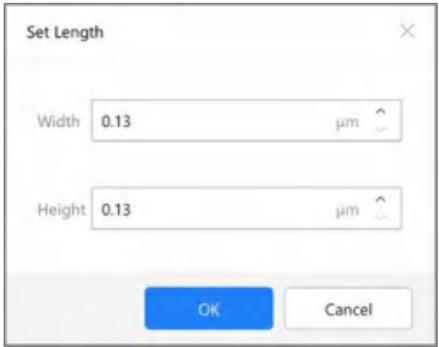
The method of drawing a graph includes basic graph and specified graph. To delete the specified drawing area, click [Delete]. To delete all the drawn areas, click [Reset]. The detailed steps of each drawing Item are as follows:

## 3D measuring microscope operating instructions

### Basic Graph

ITEM	STEP
	<ol style="list-style-type: none"> <li>1. Click the specified start point and waypoint.</li> <li>2. Double-click the end point to finish drawing polygon area.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Click the circle area determined by the specified 3 points.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Drag the mouse to draw the curve.</li> <li>2. Release to finish the drawing.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Click the upper-left and lower-right vertex of the specified rectangle.</li> <li>2. Draw rectangular area.</li> </ol>

### ● Specifying Graph

ITEM	STEP	SET SIGNAL
	<ol style="list-style-type: none"> <li>1. Select “Radius” or “Diameter” according to needs.</li> <li>2. Enter “Length” value.</li> <li>3. Click OK. Click the desired position on the image to place the circular area in the specified position.</li> </ol>	
	<ol style="list-style-type: none"> <li>1. Enter the value of rectangles such as width and height.</li> <li>2. Click OK to click the desired position on the image to place the rectangular area in the specified position.</li> </ol>	

## 3D measuring microscope operating instructions

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- “Display Settings” is used to set the parameters of drawing:

ITEM	STEP
COLOR	Set the color of the drawing area. Click to select the color.
CHECK AREA	Select the check box and drag the slider to set.

- Set parameters of extracting area by display settings.

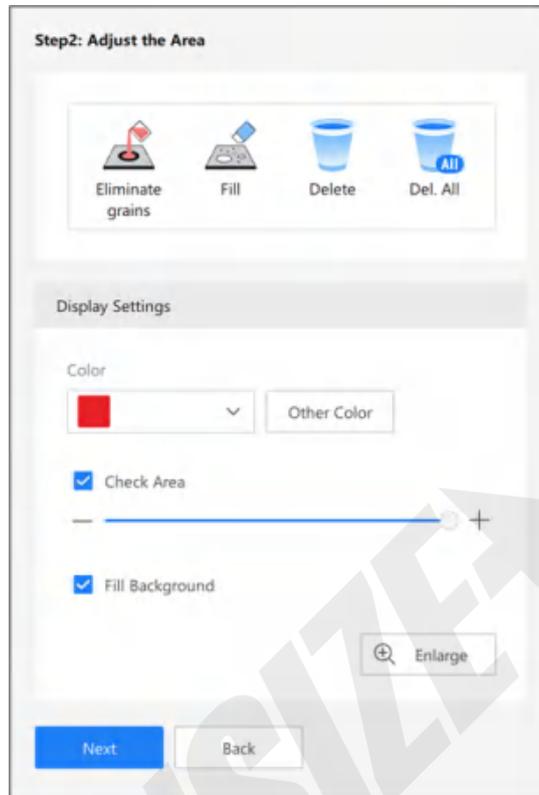
ITEM	STEP
COLOR	1. Set the color of the drawing area. Click to select the color.
CHECK AREA	1. Select the check box. 2. Drag the slider to set.
ENLARGE	<p>1. Click Enlarge to enter. 2. Set mag., and drag to zoom in the area.</p> <div style="text-align: center;">  </div> <p>Note: The [Enlarge] can be enabled in advance. It can be used in the selection process of Extract Brightness, Extract Color, etc.</p>

- Click [Next] to enter the next window. Click [Back] to return to the previous window.

## 3D measuring microscope operating instructions

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Adjust the area: To correct the extracted area. The extraction area contains many closed and selected areas, or closed and empty areas, which are called grains. The “Step2: Adjust the Area” window is as follows.



- Eliminate Grains

Click **Eliminate Grains** to enter the settings window. This function uses “Area” as the judging parameter to shape the extraction area and remove grains that are not measured objects.

Eliminate grains ✕

Parameters  
Area ▼

Specify Screen

Function Menu Display Settings

Specified Grain  
  $\mu\text{m}^2$

Large Grain  Small Grain

Specify Histogram

Remove grains from edges of extracted area



Upper Limit  
  $\mu\text{m}^2$  ^  
v

Lower Limit  
  $\mu\text{m}^2$  ^  
v

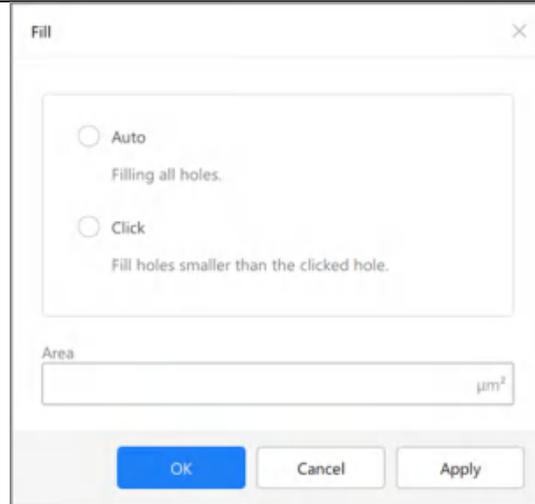
## 3D measuring microscope operating instructions

ITEM	STEP
SPECIFY SCREEN	<ol style="list-style-type: none"><li>1. Select the elimination grain types. [Large Grain] refers to grains larger than the specified value, and [Small Grain] refers to grains smaller than the specified value.</li><li>2. Click the extraction area and select the area that is closed as the reference grain. The reference grain area value will be displayed in the "Specified Grain".</li><li>3. The selected grain will be displayed in real time during the area extraction process. The corresponding area of [Large Grain] is the grain larger than that of the reference, and the corresponding area of [Small Grain] is smaller than that of the reference.</li><li>4. Click Apply. The selected grains are no longer marked as the extraction area.</li></ol>
SPECIFY HISTOGRAM	<ol style="list-style-type: none"><li>1. Drag the histogram to remove grains from edges of extracted areas.</li><li>2. Enter the value of Upper Limit and Lower Limit to control the grain area selection range.</li><li>3. Click Apply. The selected grain will not be marked as the extraction area.</li></ol>

Click OK to complete.

- Fill

Click [Fill] to enter the settings **window**. This function uses "Area" as the judging parameter to adjust the extraction area to fill all the grain holes smaller than the set area.



ITEM	STEP
AUTO	<ol style="list-style-type: none"> <li>1. Select the check box.</li> <li>2. All the closed blank grains will be selected in real-time on the area.</li> <li>3 Click Apply. The selected grains are marked as the extraction area.</li> </ol>
CLICK	<ol style="list-style-type: none"> <li>1. Select the check box.</li> <li>2. Click the extracting area to select a closed blank area as the reference grain. The area value of the grain will be displayed in the <b>“Area”</b>.</li> <li>3. The closed blank grains smaller than the reference value will be selected in real-time on the area.</li> <li>4 Click Apply. The selected grains are marked as the extraction area.</li> </ol>

Click OK to complete.

- Delete Data

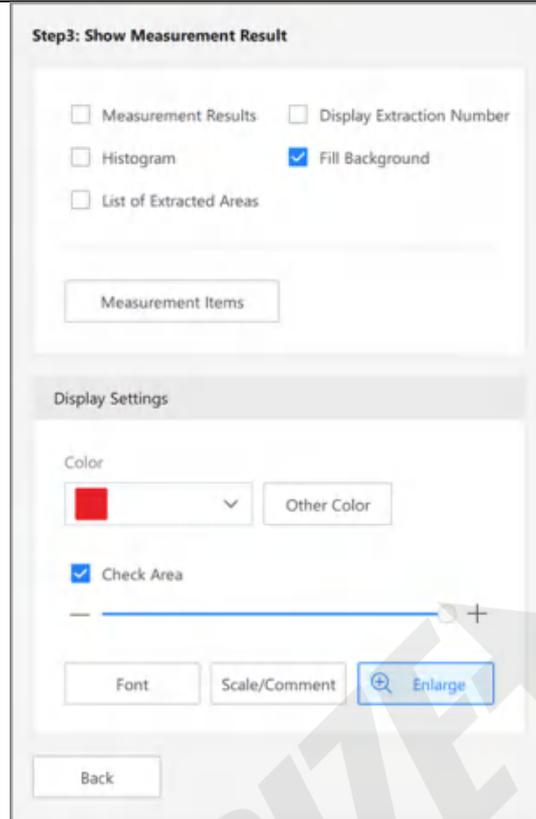
ITEM	STEP
	<ol style="list-style-type: none"> <li>1. Click Delete to select it.</li> <li>2. Click the extracted grain to delete.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Click Delete All to pop up the Delete confirmation dialog.</li> <li>2. Click OK. All adjustment operations of Areas are discarded.</li> </ol>

- Set parameters of extracting area by display settings.

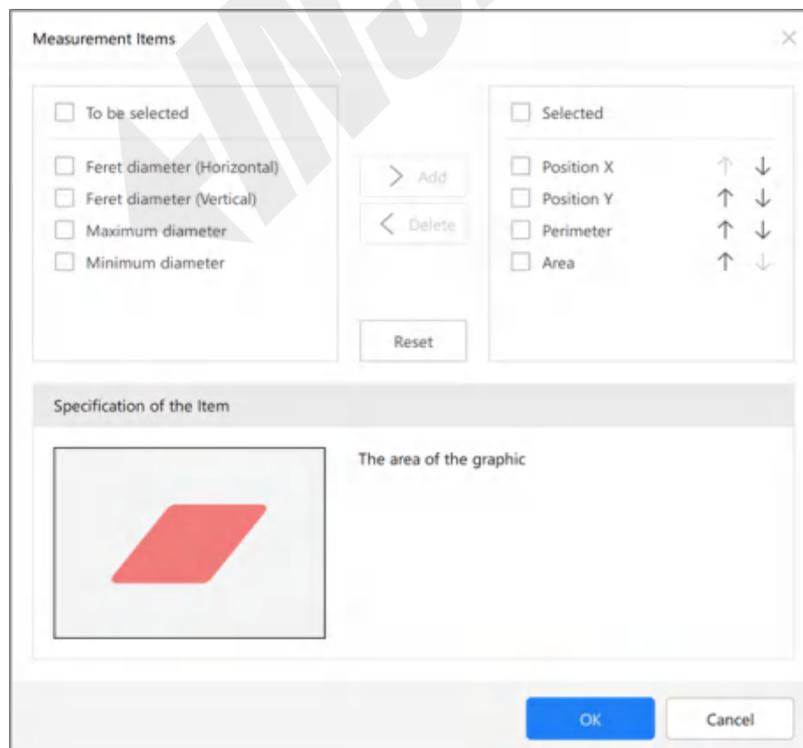
## 3D measuring microscope operating instructions

ITEM	STEP
COLOR	<ol style="list-style-type: none"> <li>1. Click to set the color of extraction area.</li> <li>2. Other colors are used to set the “background” color and the current “selected” area color. Click to select.</li> </ol>
CHECK AREA	<ol style="list-style-type: none"> <li>1. Select the check box.</li> <li>2. Drag the slider to set.</li> </ol>
FILL BACKGROUND	<ol style="list-style-type: none"> <li>1. Select the check box.</li> <li>2. The color of non-extracted areas will be changed to background color.</li> </ol>
ENLARGE	<ol style="list-style-type: none"> <li>1. Click Enlarge to enter.</li> <li>2. Set mag., and drag to zoom in the area.</li> </ol> <div style="text-align: center;">  </div> <p>Note: The [Enlarge] can be enabled in advance. It can be used in the selection process of Eliminate Grains, Fill, etc.</p>

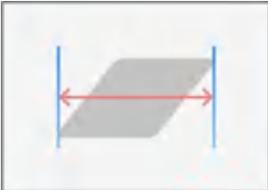
- Click [Next] to enter the next window. Click [Back] to return to the previous window.
3. Display results, auto measure, and make data statistics of the extracted areas. Select data according to needs. The “Step3: Show Measurement Result” window is as follows.



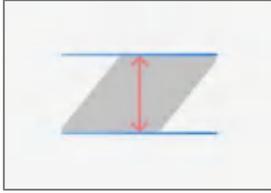
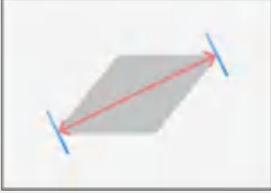
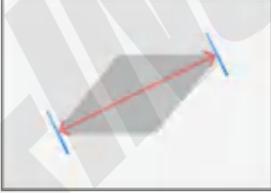
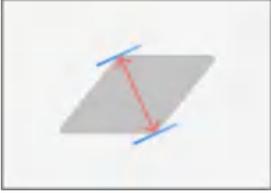
- Click "Measurement Items" to enter the settings window and customize the display Items in the measurement result.



## 3D measuring microscope operating instructions

ITEM	FUNCTION
POSITION X	<p>The X coordinate for the center of gravity of the selected area.</p> 
POSITION Y	<p>The Y coordinate for the center of gravity of the selected area.</p> 
PERIMETER	<p>The perimeter of the area.</p> 
AREA	<p>The area of the graphic.</p> 
FREIT DIAMETER (HORIZONTAL)	<p>The X-way length of the external rectangle of the selected area.</p> 

### 3D measuring microscope operating instructions

<p>FREIT DIAMETER (VERTICAL)</p>	<p>The Y-way length of the external rectangle of the selected area.</p> 
<p>FREIT DIAMETER (MAX.)</p>	<p>The max. length between any two points of the particle pattern.</p> 
<p>FRAT DIAMETER (MIN.)</p>	<p>The shortest distance between the 2 lines when the example graph is clamped with two straight lines in parallel.</p> 
<p>MAXIMUM DIAMETER</p>	<p>The max. length between any two points of the selected area.</p> 
<p>MINIMUM DIAMETER</p>	<p>The min. length between the 2 lines when the graph is clamped with two straight lines in parallel.</p> 
<p> OPERATION</p>	<p>Move up or down the measurement Items.</p>
<p>ADD</p>	<p>Change the selected Item to selected.</p>
<p>DELETE</p>	<p>Change the selected Item to be selected.</p>

## 3D measuring microscope operating instructions

RESET

Restore the selected Items and selected Items to the default distribution: "X Position", "Y Position", "Wall" and "Area" are selected Items, and others are selected Items.

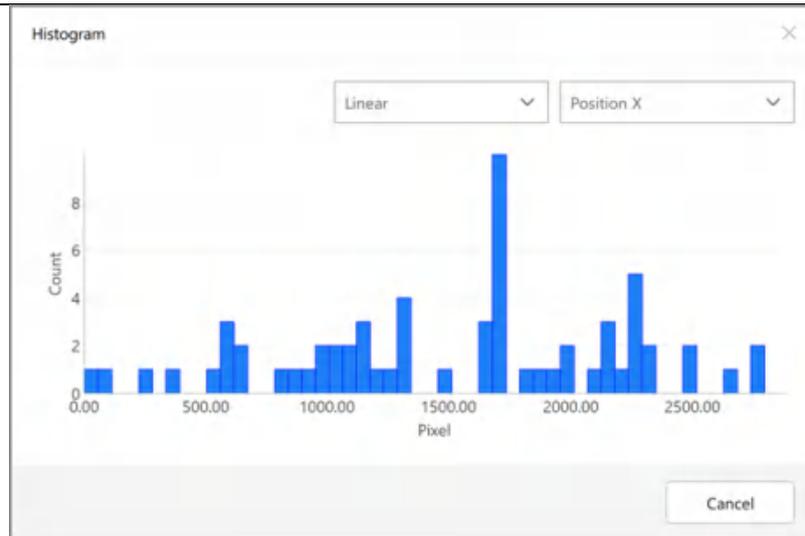
- Select [Measurement Results] to enter the result window.

<input checked="" type="checkbox"/>	No.	Position X	Position Y	Perimeter	Area
<input checked="" type="checkbox"/>	1	239.00	196.00	4513.72µm	831323.25µm <sup>2</sup>
<input checked="" type="checkbox"/>	2	1285.00	96.00	2533.69µm	305066.66µm <sup>2</sup>
<input checked="" type="checkbox"/>	3	1935.00	321.00	5729.94µm	1457347.00µm <sup>2</sup>
<input checked="" type="checkbox"/>	4	2636.00	309.00	4034.94µm	857307.06µm <sup>2</sup>
<input type="checkbox"/>	5	1731.00	137.00	0.00µm	4.58µm <sup>2</sup>
<input type="checkbox"/>	6	822.00	688.00	5322.77µm	1311432.00µm <sup>2</sup>
<input type="checkbox"/>	7	1849.00	693.00	74.93µm	64.06µm <sup>2</sup>
Average		1523.75	230.50	4203.07µm	862760.99µm <sup>2</sup>
Standard D...		882.30	91.70	1144.87µm	407913.46µm <sup>2</sup>
Maximum		2636.00	321.00	5729.94µm	1457347.00µm <sup>2</sup>
Minimum		239.00	96.00	2533.69µm	305066.66µm <sup>2</sup>
Count: 13		Extracted Area: 11389114.08µm <sup>2</sup>		Total Area: 28462822.20µm <sup>2</sup>	

## 3D measuring microscope operating instructions

ITEM	FUNCTION
NO.	Serial No. tag of the measurement data on the image.
MEASUREMENT ITEMS	Measurement Item name. The measurement Item type is the custom "Selected" Item in [Measurement Items]. Note: To sort according to a certain measurement Item, click the corresponding measurement Item. <b>For example, click "Position X"</b> .
RESULT	The corresponding measurement data value of all grain areas.
AVERAGE	Average value of selected data of corresponding measurement Item.
STANDARD DEVIATION	The standard deviation of the selected data of the corresponding measurement Item.
MAXIMUM	The maximum value of the selected data of the corresponding measurement Item.
MINIMUM	The minimum value of the selected data of the corresponding measurement Item.
COUNT	Count the number of grains.
EXTRACTED AREA	The area value of all grains.
TOTAL AREA	Total area of the whole display area.
SAVE CSV	Save the selected measurement data as CSV file.

- Select [Histogram] to enter the window to count histogram of all the corresponding measurement Items.



ITEM	FUNCTION
COUNTING METHOD	Linear statistics and logarithm statistics are available.
MEASURE ITEM	You can select the customized selected Items in [Measurement Items].

- Select [List of Extracted Areas] to enter the settings window.

All grain areas will be displayed independently in the window, and the order will be determined according to the "Measurement Items". The type is the customized selected Items in [Measurement Items].



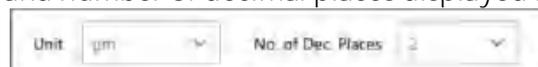
- Select [Display Extraction Number], all the grains will be numbered in the image window, and the No. value is correspond to the serial No. in [Measurement Result].
- Select [Fill Background], the color of non-extracted area will be replaced with background color.
- Set parameters of extracting area by display settings.

## 3D measuring microscope operating instructions

ITEM	STEP
COLOR	1 Click Select Color to set the color of the drawing area. 2 Other colors are used to set the “background” color and the current “selected” color. Click Select Color to select the color.
CHECK AREA	1 Check the check box. 2 Check if the extraction area is suitable by dragging progress bar to dilute the area.
FONT	1 Click Font to set size and color.
SCALE/COMMENT	Refer to Scale and Comment chapter respectively.
ENLARGE	1. Click Enlarge to enter. 2. Set mag., and drag to zoom in the area. 

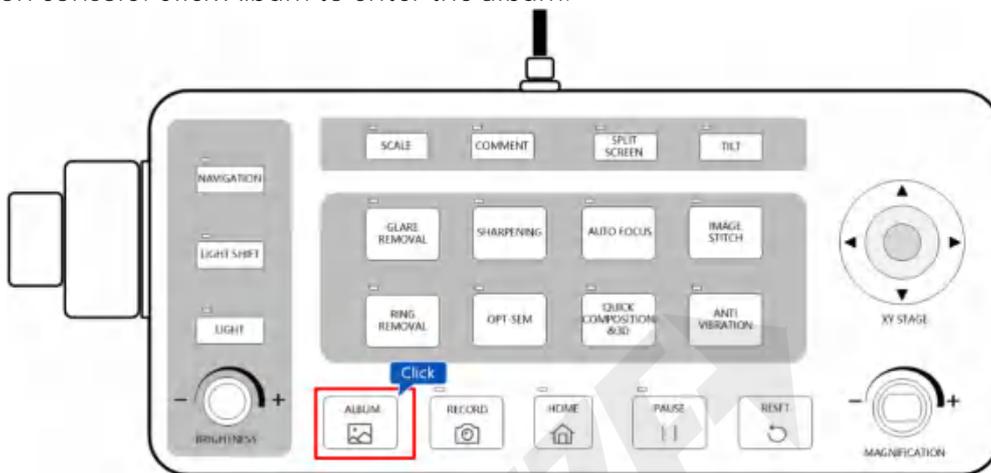
### 9.3.2 Unit and Decimal Places

It is used to change the unit and number of decimal places displayed in the measurement result.



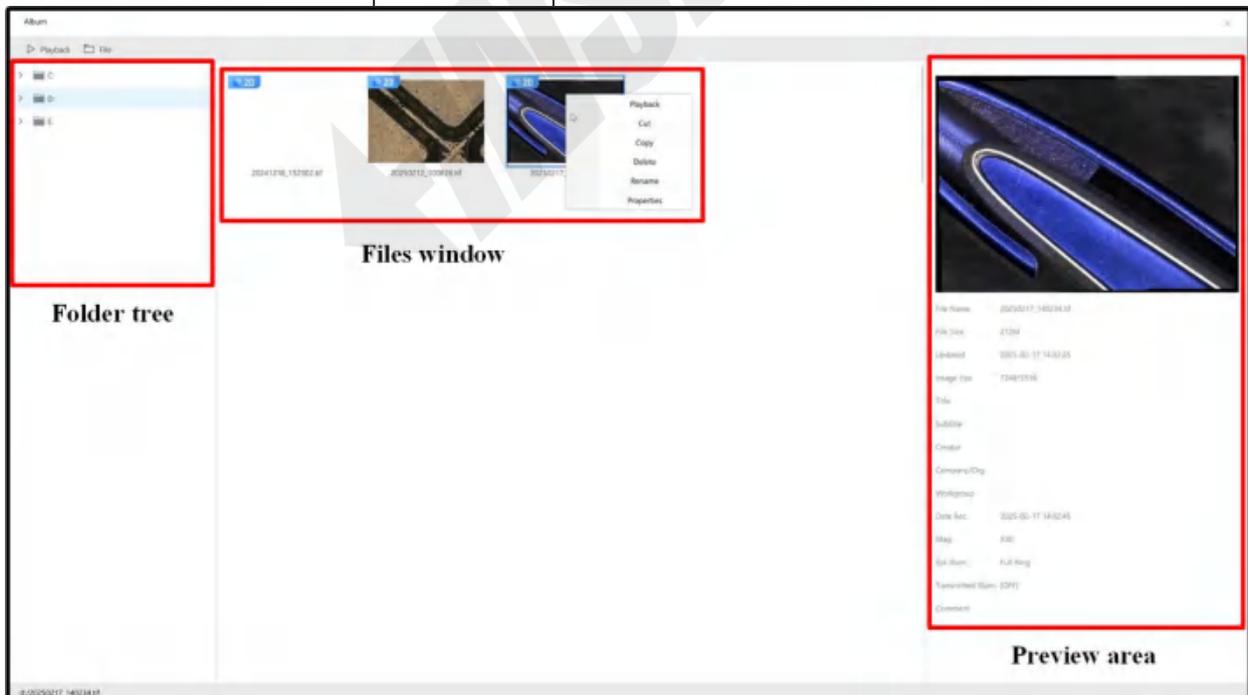
## Chapter 10 Album

The album is for saving and managing images: Display thumbnails, confirm and manage the recorded and saved images. Double-click the thumbnail to display/playback.  
 Operation on console: Click Album to enter the album.



### 10.1 Album

The name and function description of each part of the album window is shown below.



Album Window

## 3D measuring microscope operating instructions

ITEM	FUNCTION
	Select an image file from the files <b>window</b> , and click Play to display the image in the entire window.
	<b>Operations:</b> create a folder, change a folder name, and delete a folder.
Folder Tree	Display the folder tree of each saving location, such as HDD.
Files Window	Display the saved files in the selected folder. The images are in 2D/3D format.
Preview Area	Preview an image and view the image's properties and information.

### 10.1.1 File Format

- 2D File

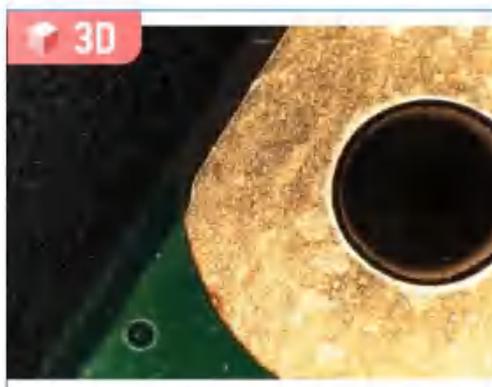
2D is displayed in the upper-left corner of the thumbnail. Click the image to display it in the observation window.



2D File Type

- 3D File

3D is displayed in the upper-left corner of the thumbnail to show the 3D file that can be played.

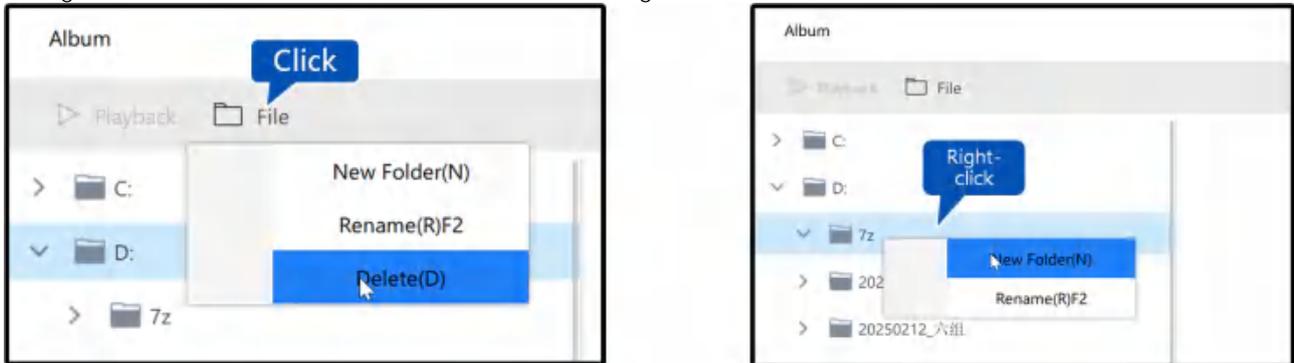


3D File Type

### 10.1.2 Folder Operation

Steps

1. Select a folder, and click File. You can create a folder, and rename/delete the selected folder.
2. Right-click a folder and select New Folder to create a sub-folder.
3. Right-click a folder and select Rename to change the folder name.



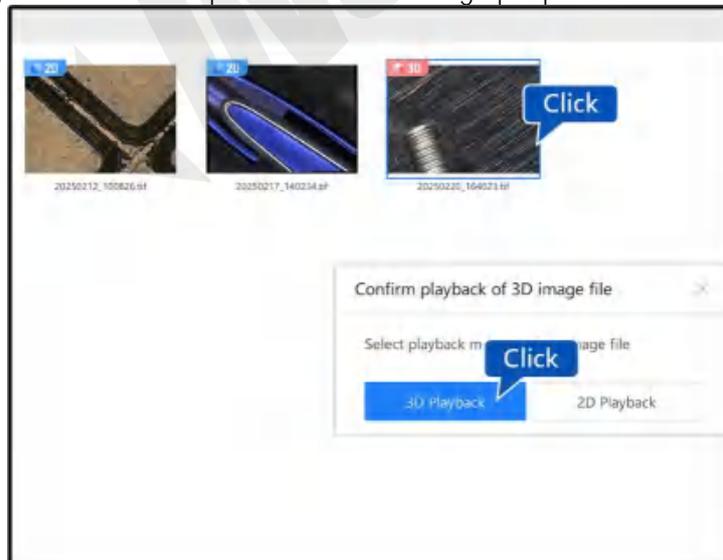
Folder Operation

### 10.1.3 File Operation

There are 3 methods of playback: Click Playback; Double-click the file; Right-click the file.

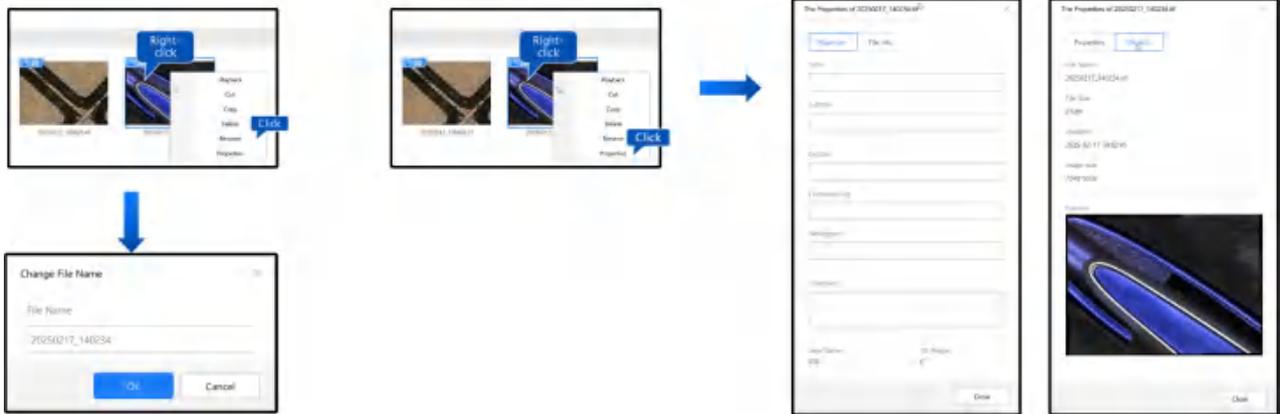
Steps

1. Select a file. Click Playback or double-click the image. If it is a 3D image, a window will pop up to confirm playback of 3D image file.
2. Right-click an image. You can playback, cut, copy, and delete it.
3. Right-click an image and select Rename to rename it.
4. Right-click an image and select Properties to view image properties and file information.



Playback of 3D Image

## 3D measuring microscope operating instructions



File Operation

### 10.2 Side Album

Display thumbnails of the selected folder in observation window. You can playback the images in the side album.



Side Album

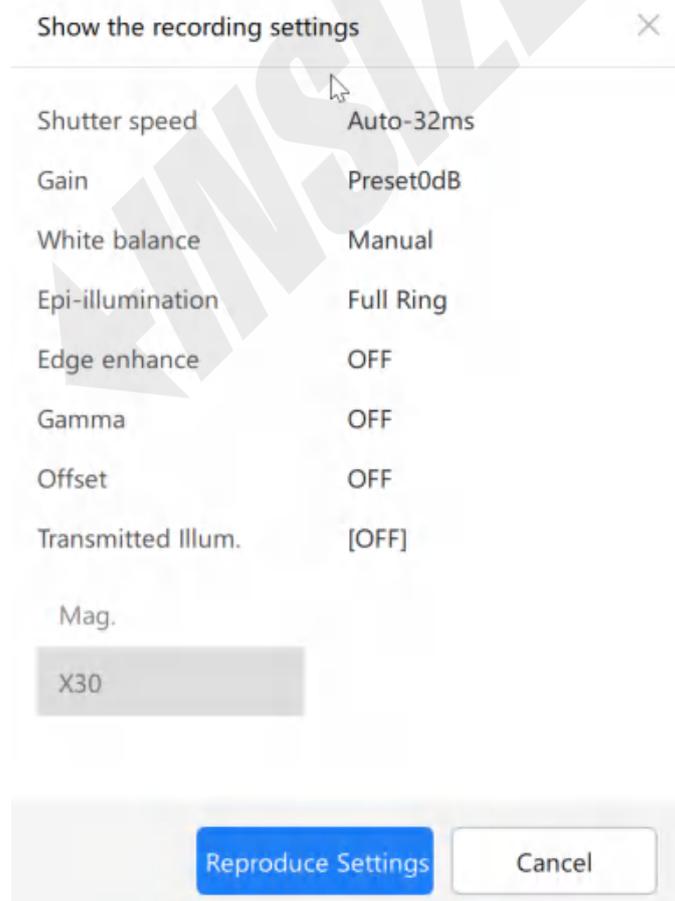
## 3D measuring microscope operating instructions

ITEM	FUNCTION
Select Folder	Display the folder tree of each saving location, such as HDD.
Filename	Display the saved files in the selected folder. The images are in 2D/3D format.
<b>Reproduce Settings</b>	<b>Rec</b> <b>Apply the settings of the selected image to the current image. The applicable settings are limited to the items displayed in Display Settings.</b>
Display Settings	<b>Display the settings of the image. Click Reproduce Settings to apply the settings.</b>

- The playback mode of images in the side album: Double-click the image.
- Recreate rec settings and display settings.

### Steps

1. Select an image and click Display Settings to display the settings.
2. Click Reproduce Settings to apply the settings of the image, including: exposure, gain, white balance, epi-illumination, image settings, transmission illumination, and magnification.

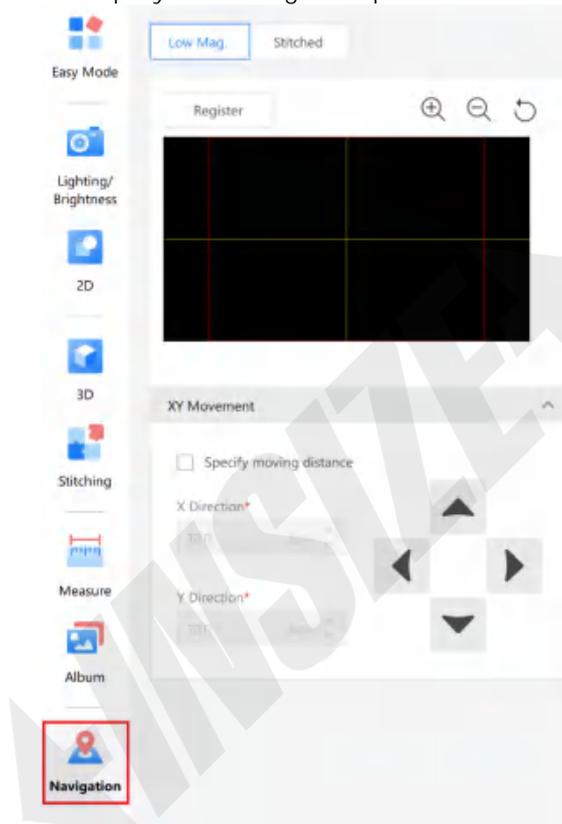


## Chapter 11 Navigation

You can register the image with a large view range formed by low mag. or stitched image as a navigation image. Click on the Navigation pane to jump to the specified location. During high mag. observation, you can intuitively tell which part of the image is being viewed and thereby improve the observation efficiency.

Create Navigation

Click Navigation in the menu to display the Navigation pane.

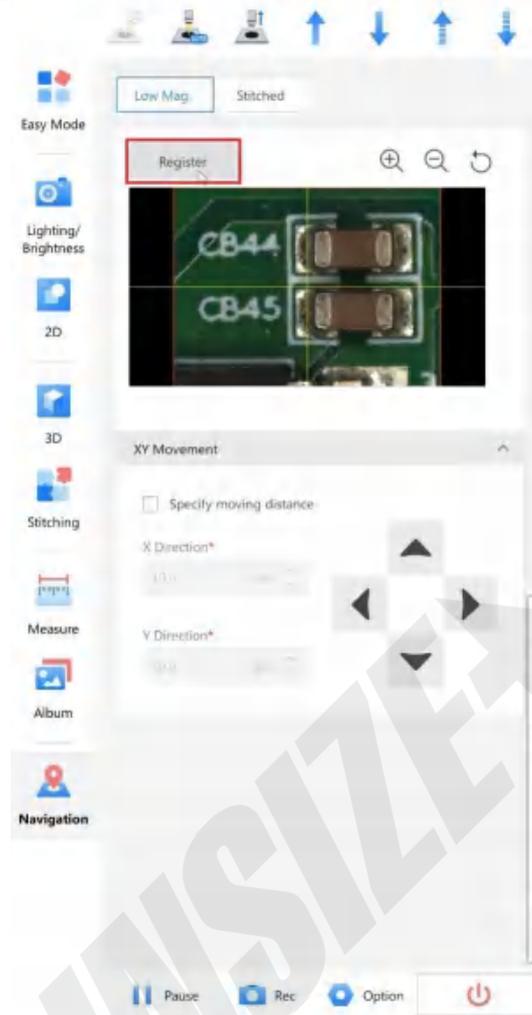


Navigation

### 11.1 Register Low Mag. Image

Steps

1. Set the location and the magnification for the image to be registered as navigation, and click Register.



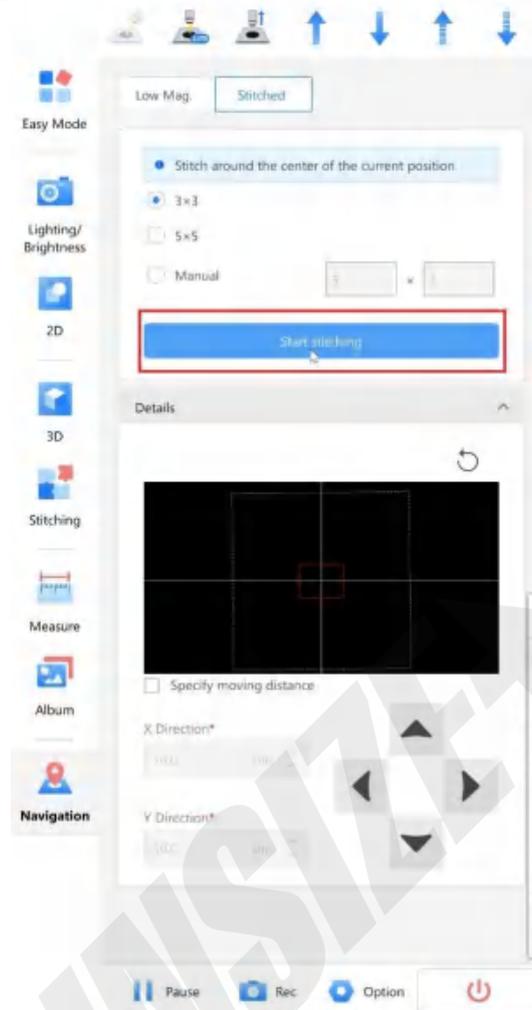
Register Low Mag. Image Magnification

2. Click XY Movement and check Specify moving distance. You can specify the stage moving distance in x and y directions.
3. On the image in Navigation pane, click the position you want to observe.
4. The stage will move to the position you clicked.

### 11.2 Register Stitched Image

#### Steps

1. On the Navigation pane, select the Stitched tab.

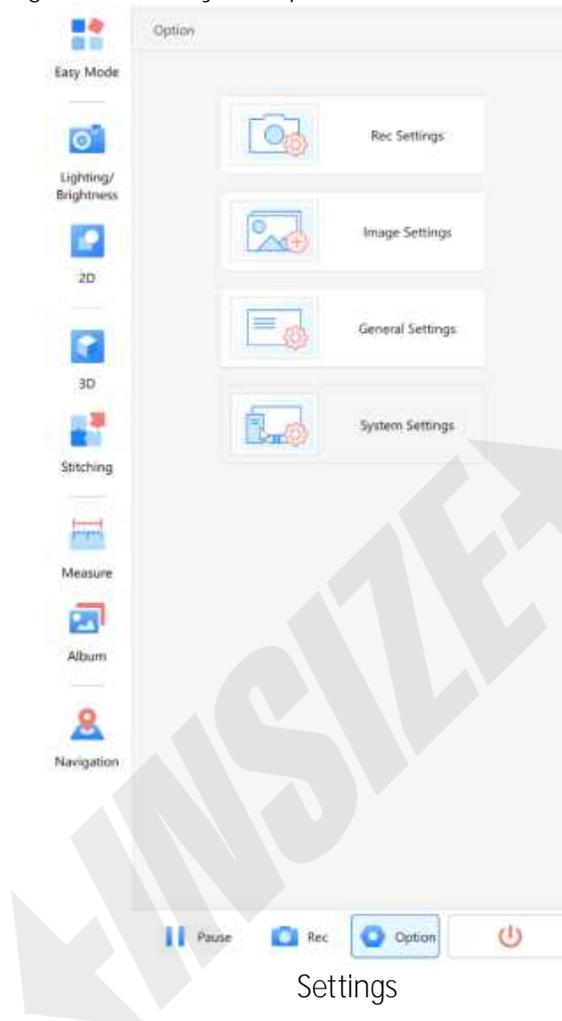


Stitched Image Pane in Navigation

2. Select  $3 \times 3$ ,  $5 \times 5$ , or Manual (enter the specific number).
3. Click XY Movement and check Specify moving distance. You can specify the stage moving distance in x and y directions.
4. The stage will move to the position you clicked.

## Chapter 12 Settings

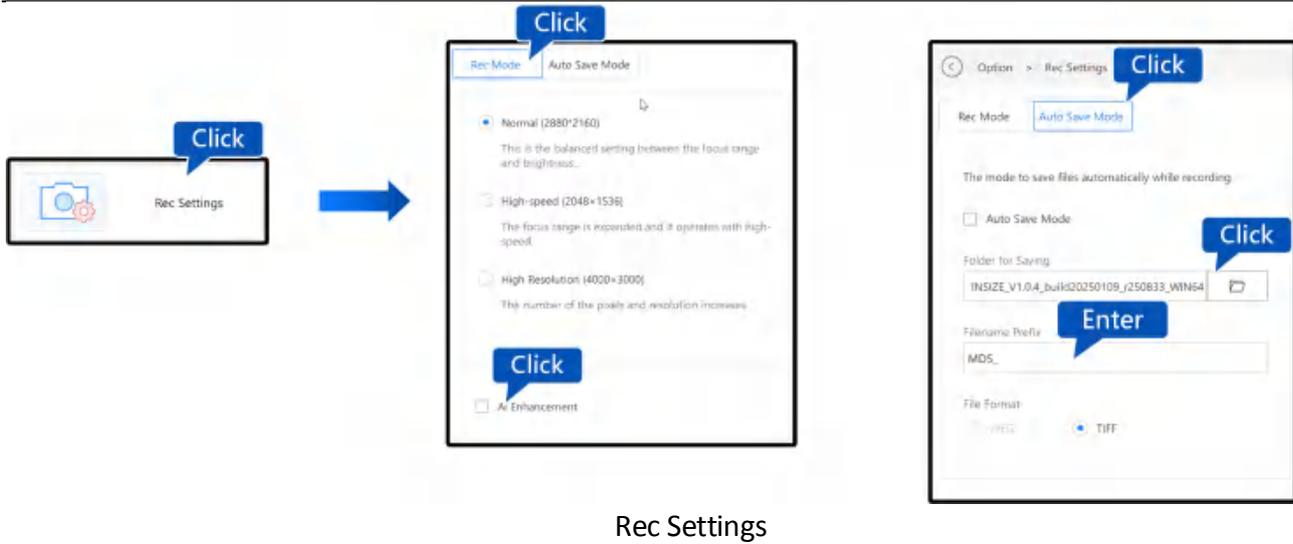
It configures record, image, general and system parameters.



### 12.1 Rec Settings

Steps

1. Click “Rec Settings” to enter the record settings page and enter the “Rec Mode” tab by default.
2. Save the resolution of normal (2880\*2160) in the “Rec Mode” tab. You can select high-speed or high resolution mode.
3. In the “Rec Mode” tab, you can select AI Enhancement by default, and click AI Enhancement to improve image resolution.
4. In the “Auto Save Mode” tab, select “Auto Save Mode” by default. After selecting “Auto Save Mode”, click “Folder for Saving” to select the file path.
5. In the “Auto Save Mode” tab, you can enter the start of file name, MDS\_ by default.



## 12.2 Image Settings

The image settings contain the basic settings of the image and the white balance settings. You can change the observing effect in the display window.

[Basic Image Setting] includes edge enhance, gamma, offset, monochrome, and relief. It provides richer observations in specific sample observations.

ITEM	FUNCTION
Edge enhance	The outline of the image can be highlighted to make the scratches and fine points easy to view.
Gamma	The contrast of the bright or dark part of the image can be corrected.
Offset	Adjust the overall light and darkness of the image.
Monochrome	The image is monochrome during observation, and will not be influenced by color.
Relief	Emphasize the brightness change on the image, and it is easy to observe scratches and fine points.

[White Balance Setting] includes Auto White Balance (Push-Set), Manual White Balance, and Batch Execute Auto White Balance (Batch Execute Push-Set).

ITEM	FUNCTION
Push-Set	Capture white object. Click Execute to adjust the white balance.
Manual	Drag R/G/B sliders to adjust the white balance.
Batch Execute Push-Set	Auto switch lighting, perform Push-Set on all pictures, and adjust the white balance.

Steps

1. Click “Image Settings” to enter the image settings page and enter the “Basic Image Setting” tab by default.
2. In the “Basic Image Settings” tab: All image effects are disabled by default. You can select and set Edge Enhance, Gamma, Offset, Monochrome, etc.
3. Click to enable Monochrome, or relief.

In the “White Balance Setting” tab: Enter manual white balance by default (built-in parameter).

4. Click to select “Push-Set” button, and then click Execute to set the automatic white balance.
5. In the “White Balance Setting” tab: You can click the “Batch Execute Push-Set” button, then the device will switch the lighting automatically, and perform the automatic white balance.

Note: If you are not satisfied with the auto-white balance effect, the white balance parameter can be restored to the manual white balance (built-in parameter) by switching the ratio.



### 12.3 General Settings

General settings include basic settings and XY Stage.

[Basic Settings] include Focus Area Size, Unit and No. of Dec. Places in Function Menu Display Settings.

## 3D measuring microscope operating instructions

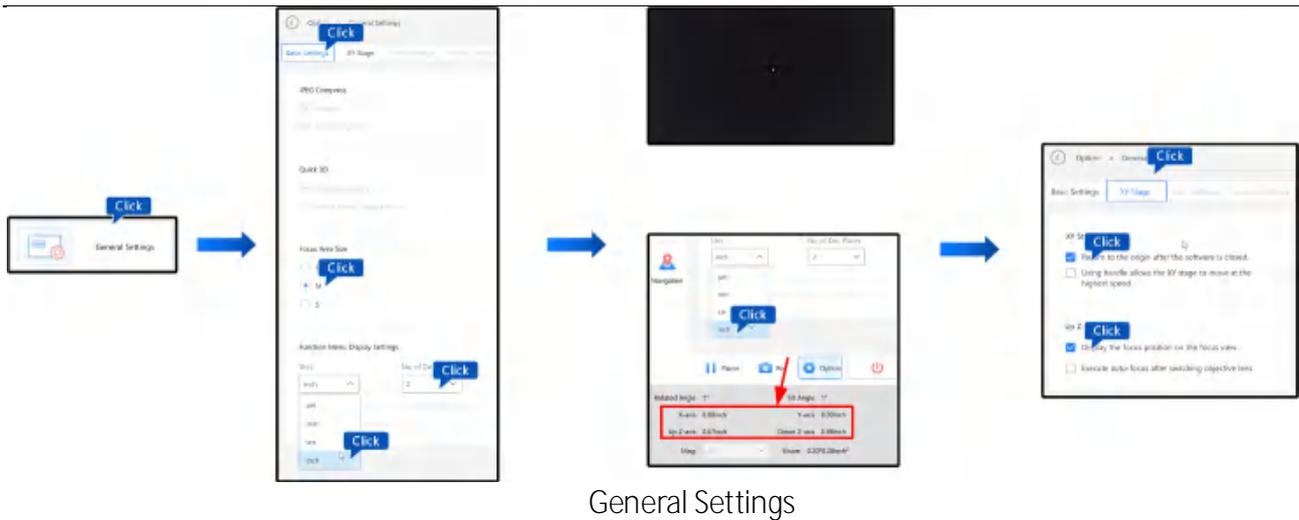
ITEM	FUNCTION
<b>Focus Area Size</b>	It offers the selection of three types of auto-focal, and the auto-focal of smaller samples.
Function Menu Display Settings	You can change the display units and decimal places for the motor axes (X, Y, Z). The units can be set to m, mm, cm or inch, and the decimal places can range from 0 to 2.

[XY Stage] includes XY Stage and Up Z-axis.

ITEM	FUNCTION	
XY Stage	<b>Return to the origin</b> after the software is closed.	Enabled by default. After disabling, there will be no prompt asking "Return to Origin?".
	Using console allows the XY stage to move at the highest speed.	Disabled by default. After enabling, the console will control the XY Stage moving at max. speed.
Up Z-axis	Display the focus position on the focus view.	Enabled by default. The device will hide focus triangle in focus view after disabling it.
	Execute auto-focus after switching objective lens.	Disabled by default. Switching the objective lens will execute auto focus after enabling it.

### Steps

1. Click "General Settings" to enter the general settings page and enter the "Basic Settings" tab by default.
2. In the "Basic Settings" tab, you can select the focus area size, and double-click to execute auto focus on the video stream interface.
3. In the "Basic Settings" tab, you can select the unit as mm in the function menu display settings, and then you can select the unit as mm of the axis coordinates displayed in the function menu location at the bottom.
4. In the "XY Stage" tab, you can click to select "Return to the origin after the software is closed" and "Using console allows the XY stage to move at the highest speed".
5. In the "XY Stage" tab, you can click to select "Display the focus position on the focus view" and "Execute auto-focus after switching lens".



## 12.4 System Settings

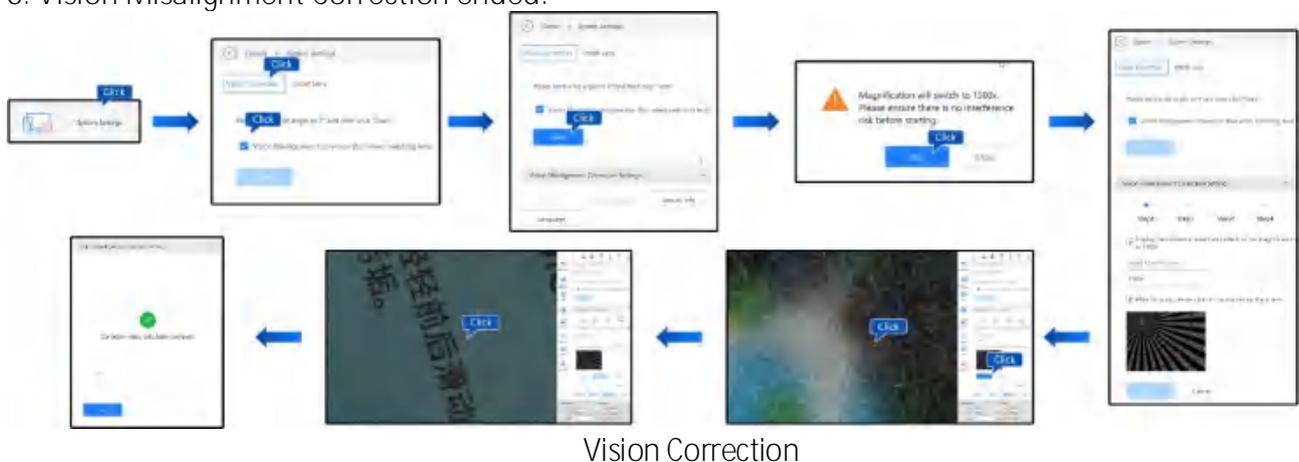
System settings include vision correction, objective lens installation, and version information.

### 12.4.1 Vision Correction

When switching lens, the position of XY Stage will be corrected to make sure the center of vision is the same.

Steps

1. Click **"System Settings"** to enter the system settings page and enter the **"Vision Correction"** tab by default.
2. By default, select **"Vision Correction"**, click **"Vision Misalignment Correction"**, and then click **"Start"**.
3. The window will pop up to check the interference risk after the magnification switches to 1500x. Click **Start/Close**.
4. Start from 1500x. After the focus is clear, mark on video stream.
5. Follow the steps to repeat the mark and switch the ratio until the end of 30x.
6. Vision Misalignment Correction ended.



### 12.4.2 Objective Lens Installation

The setting is not supported in the current version. Please refer to the actual device.

### 12.4.3 Version Information

Version information includes serial number (head of device), version number, head MCU version number, and body MCU version number.

Steps

1. Click “System Settings” to enter the system settings page, and click “Version Info”.
2. View the pop-up window content, including Serial Number, Version Number, Head Version Number, and Body Version Number.

