

Software for Observation and Measurement

SGMMS V2.6

Users Manual

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1 Overview

Using our 2-million-pixel USB 2.0 Color CCD Camera (SK-TC202USB-AT), SGMMS is software capable of observing and measuring microscopic images. Connecting the SGMMS to our stage controller additionally allows stage operations, all-in-focus image construction, and review of cross-sectional shapes from 3D displays.

2 Before Use

2-1 Operational Environment

Software usage requires the following operational environment.

OS	: Microsoft Windows XP(SP3) , 7 (The 64bit version works as a 32bit application)
CPU	: Pentium4 2.6GHz or more
Memory	: 512MB or more
Hard Disk	: 10MB or more of free space is necessary
USB	: Able to use USB2.0
Drive	: CD-ROM or DVD-ROM
Other	: Ensure proper functioning once the CCD Camera's Device Driver is installed : Microsoft .NET Framework4.0 is installed (on the CD-ROM) : Microsoft Visual C++ 2010 x86 Redistributable is installed (on the CD-ROM)

2-2 Installation preparation

Please prepare as follows prior to software installation.

- Please ensure the Microsoft .NET Framework 4.0 is installed in the computer to be used. If not already installed, or when in doubt, please click 「dotNetFx40_Full_x86_x64.exe」 as recorded on the CD-R to install.
- Please ensure Microsoft Visual C++ 2010 x86 Redistributable is installed in the computer to be used. If not already installed, or when in doubt, please click 「vcredist_x86.exe」 as recorded on the CD-R to install.
- Connect the CCD Camera to the PC. Please ensure the CCD Camera's Device Driver is installed and the camera is working without problems. Please refer to the manual that came with the CCD Camera with concerns regarding the connection method.

2-3 Installation

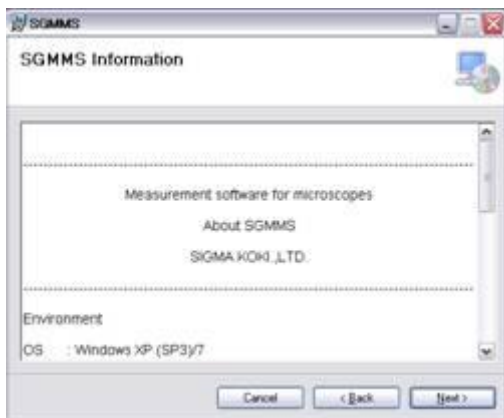
- ※ Depending on your PC environment, 「Administrator」 privileges may be required, in which case, please conduct installation by logging in under an authorized username.

Installation Instructions

- 1) With the CD-ROM set to PC, starting「SGMMS Setup.exe」will display an Install screen. To install, click 「Next」. To stop, click 「Cancel」.



- 2) Please check software information and accept the license terms by clicking 「Next」.



- 3) Specify the destination folder for installation. To install in the displayed folder, please click 「Next」. To install in a different folder, click the 「Reference」 button, and choose a folder from the displayed screen.



- 4) After conducting all of the above settings, installation preparation is complete. If the conditions displayed in the center screen are fine, please click 「Install」. If installation does not work, click 「Cancel」. To change conditions, please click 「Back」.



- 5) With successful installation, the Setup Wizard Completion will display. Click 「Close」 to complete installation.



2-4 Program Startup

To start the software, either double-click the shortcut icon on the desktop, or select 「SGMMS」 under 「All Programs」 from the 「Start」 menu.



2-5 Uninstall

Choose 「Add or Remove Program」 from the 「Control Panel」. From the new screen, select 「SGMMS」 and click the 「Delete」 button.

3 Regarding Software License

Software must be purchased for each PC. We generate an identification ID for each computer with this software, and manage software license information using the ID. On computers with the software installed, the license key is closed and can only be used for 30 days in this closed state. However, unless unlocked, the license key becomes unusable after 30 days. Because each purchased software comes with one unlock-key (password), continued usage is possible with this purchased right. Please contact our company with the ID displayed on the Register menu of the screen following successful installation in order to obtain the unlock-key (password).

※The unlock-key (password) for license management is different from the product's serial number.

「Software Registration Instructions」

1. Install software on computer
2. Start software
3. Select the [Information] - [Registration] Menu (the ID number will be displayed)
4. Obtain the unlock-key (password) from our company (E-mail, FAX,)

Please also provide the following information.

- Name
- Country, Address
- Contact points (Tel, Email, FAX)
- Product
- Purchased Date
- Purchaser
- Serial No.
- ID No.

5. Hear back from our company with the unlock-key
6. Enter the unlock-key in the 「Registration」 menu (continued usage possible)
 - ☐ Only one license management unlock-key is provided for each device. Fees are attached to additional keys.

4 Main Screens and Configuration

Starting the program opens up the main screen. At this time, with connection to the CCD camera and successful installation from the previous section, live images are automatically displayed on the image display window.

- Image Display Window

Live and still images are displayed. Window size can be changed by the mouse.

- Menu Bar

Each function can be viewed in each group.

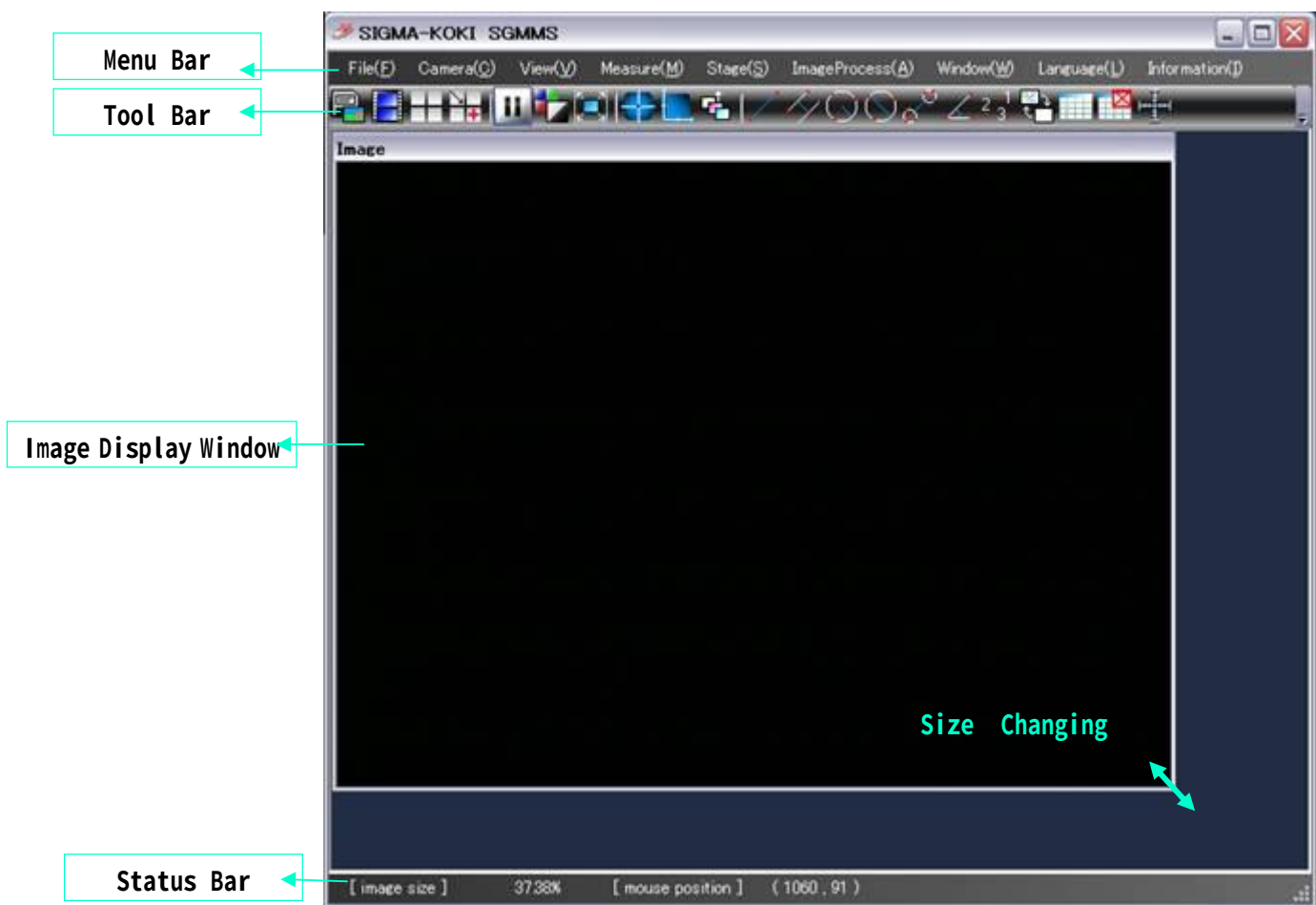
- Tool Bar

The displayed shortcut icons have nearly the same functions as that within the menu bar.

- Status Bar

[Image Display Size]: Display magnification for the Image's magnification display (horizontal 1600 x vertical 1200 pixels) is shown.

[Mouse Position] : The mouse position is shown.



Main screen

5 Each Functions and Operations

5-1 File

5-1-1 Image Save



Save the image displayed on the screen.

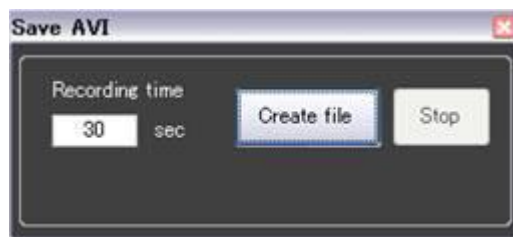
This can save as Bmp, Jpeg, Tiff, or Png files.

5-1-2 Video Save



Save video in AVI format.

After inputting the recording time, specify the storage destination through the 「Create file」 button. Then press 「Save」 button to start saving. Press 「Stop」 to stop recording at any time. The video automatically finishes recording once the duration reaches the set recording time.

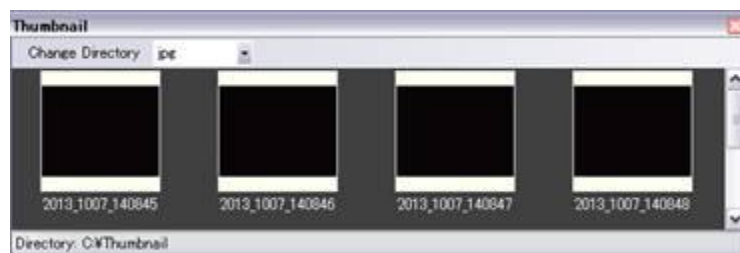


5-1-3 Thumbnail Window



Display the thumbnail image.

The storage destination is displayed at the bottom of the window in the status bar. To change the storage destination folder, choose any folder from the 「Change Directory」 menu. By switching between bmp, jpg, tif, png formats, the images below will be displayed under the chosen format. Double clicking an image will automatically pause live image and appear in the image display window. Left click or press the F2 key on an image to change its file name. To delete an image, right click a chosen image and select the 「Delete」 menu.



5-1-4 Thumbnail Registration

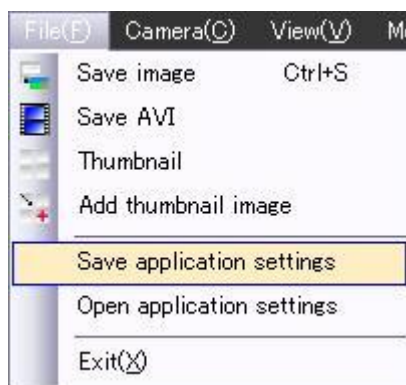


Save the image in the Thumbnail folder with a file name of the time and date when the button is pressed. The saved image takes a format already selected under the Thumbnail window's list.

5-1-5 Saving and Reading of Application Settings

While the current settings are automatically saved at the end of the software usage, when wanting to use more than one objective lens or many different settings, use this function.

Under File (F) on the menu bar → saving and reading of application settings, application setting saving and reading can be carried out.



5-2 Camera

5-2-1 Live Image / Still Image Switch



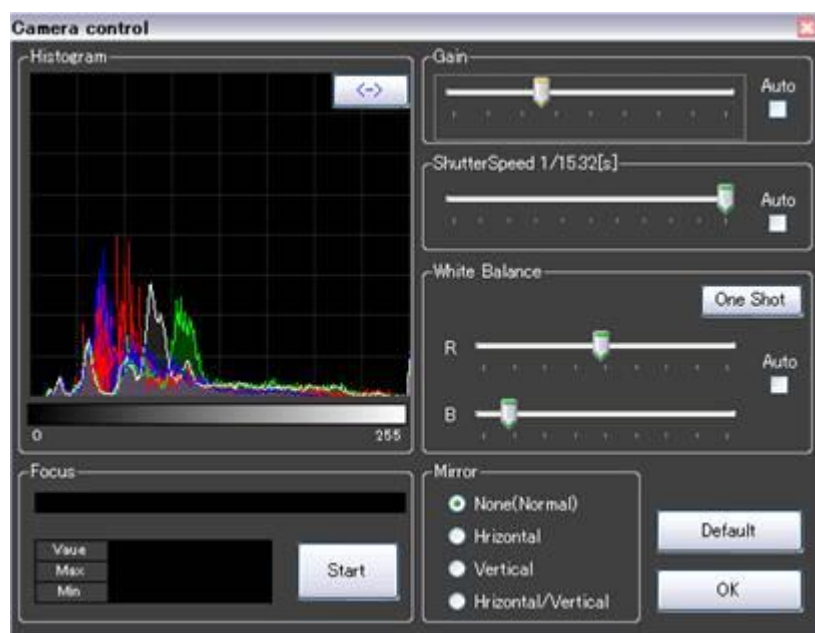
Switch the live and still image.

The camera automatically switches to still image when subjected to image processing operation.

5-2-2 Camera Control



Setting camera gain, shutter speed, white balance, and reverse display.

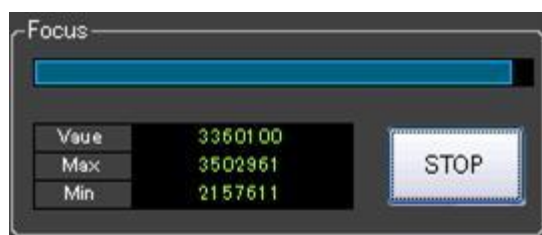


Histogram: a histogram of the live image is displayed. Clicking <-> button will display the different components.

Focus : Clicking 「Start」 button will show the live image's focus value as well as MAX/MIN values

The range of the blue bar will always be updated to be equal to the MAX value.

Adjust to be filled with the blue bar by changing the position of the Z axis stage.



5-3 Display

5-3-1 Full Screen Display



This will display the image on the full screen of the monitor display to full screen. Right-click makes return to the main screen.

5-3-2 Cross-line



This button will switch cross-lines on and off.

5-3-3 Scale Display/Hide



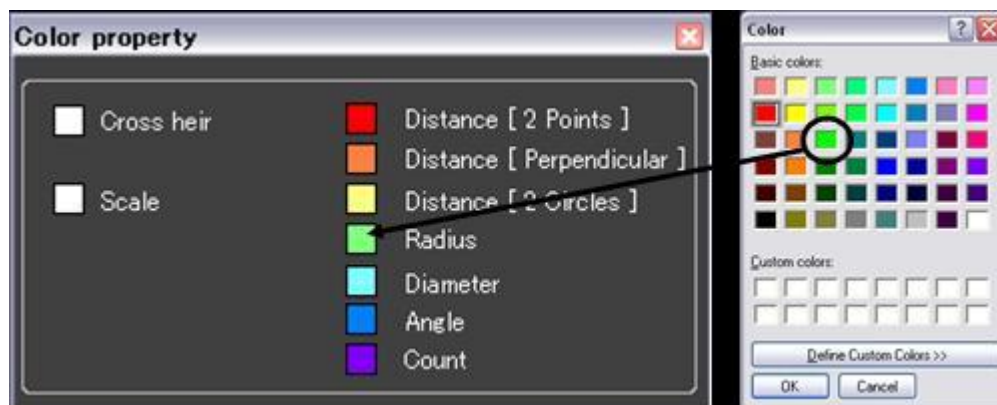
This button displays and hides the set scale length.

The display scale length can be changed under the subsequent 「display scale setting」 in the 「calibration screen」 .

5-3-4 Color Property



Color settings for drawing measurement line, cross-line, and scale display.



5-4 Measurement

By clicking the mouse at the screen, the object's dimensions can be measured.

Before measuring, please properly set to per 1 pixel dimensions under the subsequent

「5-4-5 Calibration」

5-4-1 Measurement items



Measure the distance between two points.



Measure the continuous distance from the reference line set by the two points. Right click to stop measuring.



Measure the radius from three or more points.

If you double click in the state that is determined three or more points arbitrary, measuring the radius will stop.



Measure the diameter from three or more points.

If you double click in the state that is determined three or more points arbitrary, measuring the diameter will stop.



Measure the distance between the centers of two circles. Each circle is determined by the coordinates of the three points.



Measure the angle constructed by Point 3 with respect to the reference line between Points 1 and 2. The display range of the angle is from 0° to 180° degrees.



Count the number of elements. Double clicking the last element will stop the count.

5-4-2 Display/Hide Measurement Lines



Display/Hide the measurement results drawn on the screen.

5-4-3 Display/Hide Measurement Lines



Open the window containing the measurement results.

1) Editing Items

Left click to edit the text under 「Menu」 items.

No.	Menu	Result
1	Radius	0.5027
2	Radius	0.4130
3	Angle	49.3072
4	Distance [Perpendicular]	0.5246
5	Diameter	0.6088
6	Distance [2 Points]	3.9966

2) Deleting Items

Select the cell to be deleted and then right click to display the following menu. Selecting 「Delete All」 will delete all results, including the selected item.

No.	Menu	Result
1	Radius	0.5027
2	Radius	0.4130
3	Angle	49.3072
4	Distance [Perpendicular]	0.5246
5	Diameter	0.6088
6	Distance [2 Points]	3.9966

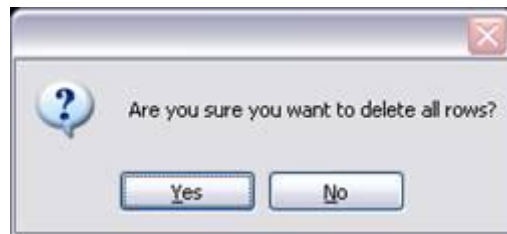
3) Saving Data (CSV Format)

Selecting 「CSV Save」 menu on the top-left of the screen will open a Dialog Box. It will save the measurement results under the CVS format.

5-4-4 Clear Measurement Results



The following confirmation screen will appear. Click 「Yes」 to clear all measurement results.



5-4-5 Calibration



Perform calibration settings for determining per 1 pixel dimensions.



1) Calibration Data Setting

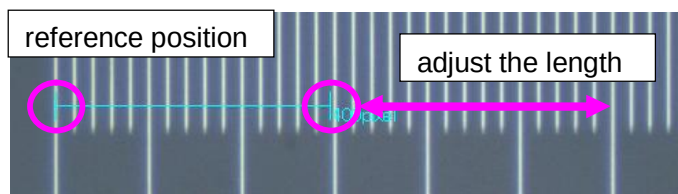
- ① Place the scale for stage criteria. At this time, utilize the cross-lines to be placed vertically or horizontally on the screen. Open the setting screen to display the calibration scale on the live image.



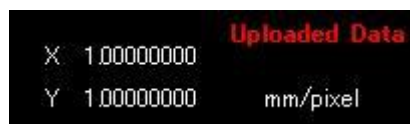
Calibration Scale

- ② In 「Scale Setting」, when calibrating in the X-direction, check X; when calibrating in the Y-direction, check Y. When performing calibrations in X, Y-directions under the same setting, check 「X=Y」.

- ③ For the X (Y)-direction, first use the mouse to drag the left edge (top edge) of the calibration scale and align the installed scale as a reference position. Afterwards, drag the right edge (bottom edge) and adjust the length.



- ④ After completing adjustment of the calibration scale, enter the actual size (unit) in mm. The 「Set」 button displays the 「Registered Data」 at per 1 pixel dimensions. To keep this data, click the 「Save」 button.



※ At this stage, the calibration setting has yet to be reflected. To the end, 3) Calibration List Registration」 must be carried out).

2) Reading Data

To use the calibration data saved from 1), press the 「Read」 button. Once the read data is displayed in 「Registration Data」, registration in the calibration list is possible.

3) Registration in the Calibration List

The setting does not take effect by simply reading the saved data or calibration operation. To reflect the uploaded data, 「Calibration List Registration」 must be carried out.

With this operation, even after changes to the microscope's magnification, you can make smooth changes in the setting data with the calibration list in the tool bar.



List 0

Calibration List

● Calibration List Registration Method

- ① After setting the scale or reading the file,
ensure a valid numerical value is displayed in the
registration data. If X or Y is 0 mm, this cannot be set.



- ② Select the desired index number setting in 「List Index」
In 「List Title」, fill in the item name displayed in the list above the tool bar
With the 「Set」 button, the settings immediately take effect. To change only the title
afterwards, check the 「Title Only」 box and then press the 「Set」 button.



4) Displayed Scale Length Setting

Set the scale length in the image display area. Pressing the 「Set」 button updates according to
current calibration settings.



5-5 Motorized Stage

You can control if equipped with our motorized stage controller.

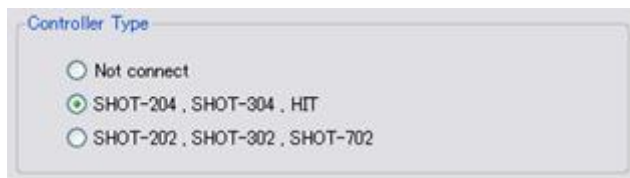
5-5-1 Connection Setting



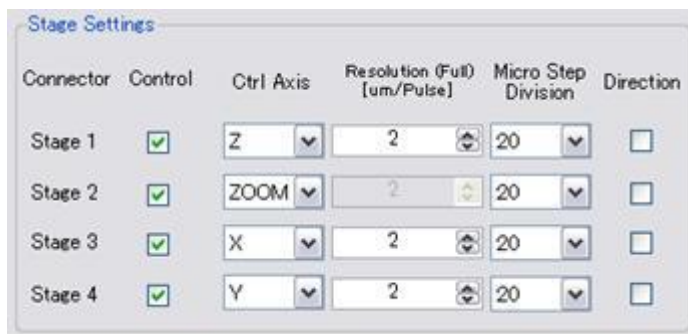
1. Open the setup screen by clicking [Stage (S)]-[Stage Settings] from the menu bar.



2. Select the stage controller to be used from the [1. Stage Controller] frame.



3. Check the axis to be used under the effective control column from the [2. Stage Setting] . Set the control axis for each stage, amount of movement per 1 pulse, and the number of divisions. Insert a check to reverse the direction of the control axis. Please check the specifications of the stage used for the full step movement amount.



4. In the [3. Communication Setting] frame, select the appropriate parameters and press 「Connection」 button.



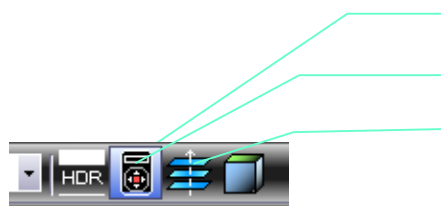
- Port : select the COM port that enables communication.
- Baud Rate: set so as identical to the Stage Controller Setting.
- Data bit : 8bit (fixed)
- Parity : None (fixed))
- Stop bit : 1bit (fixed)
- Flow control: set so as identical to Stage Controller Setting.
- Delimiter: set so as identical to Stage Controller Setting.

If the communication state is without problems, 「Connect」 should be displayed.



After establishing communication once, connection automatically occurs every time the software is booted. Check the power of the Stage Controller before booting the software.

5. Pressing the [OK] or 「Update」 buttons will carry out the settings and an icon for displaying the stage controller panel on the tool bar will appear. Further, if the control axis name is set to Z axis, icons for 3D viewer as well as a depth synthesis window will appear.



Stage Control Panel Display Button

Depth Synthesis Window Display

3D Window Display Button

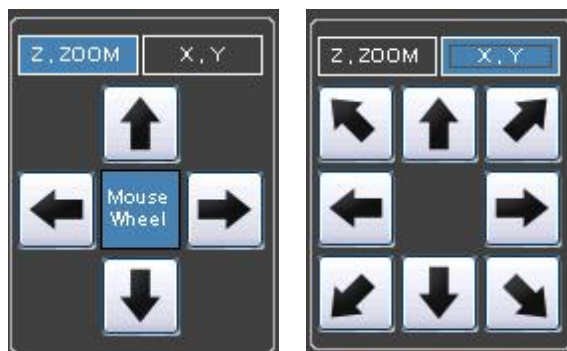
5-5-2 Operation of the Stage

The stage control panel is displayed on 「Stage」 - 「Stage Operation Screen」 of the toolbar or menu bar. At this time, if the zoom axis is not at the origin, it automatically returns the zoom axis to the origin.



Stage Control Panel

The axis to be controlled can be switched by 「Z, ZOOM」 「X, Y」 button. When you rotate 「Mouse Wheel」 in the state that the mouse cursor is on the panel of 「Mouse Wheel」, the Z axis will move according to the set movement amount.



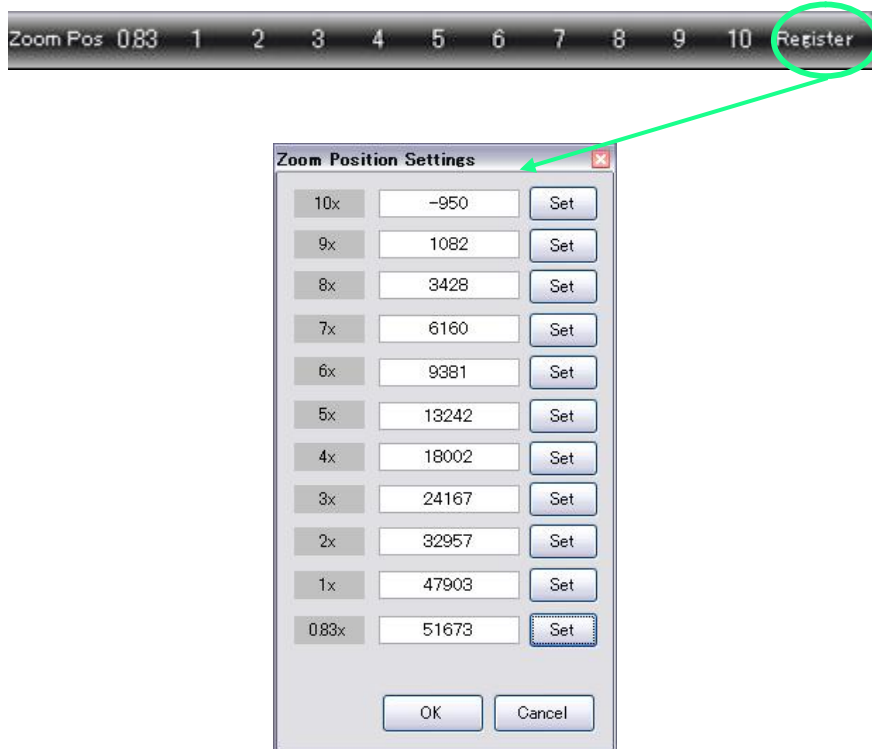
The setting speed of the stage-two of each axis can be changed.

The speed can be changed in the parameter setting screen, which is displayed by the 「Set」 button.



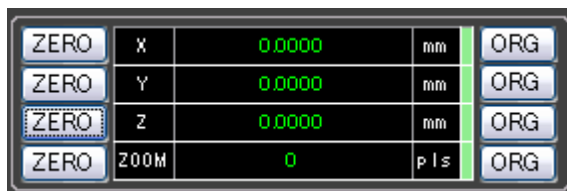
It moves to each zoom position.

The initial value is pre-set when newly installing the application, but for fine-tuning, press the 「Registration」 button and the zoom position setting screen will open. The ←,→ button on zoom axis operations determines the position. Press 「Set」 button to capture the current coordinates. Setting can also be accomplished by inputting the key. Press 「OK」 button to implement the settings.



「ZERO」 : reset the counter display.

「ORG」 : return to original operation.



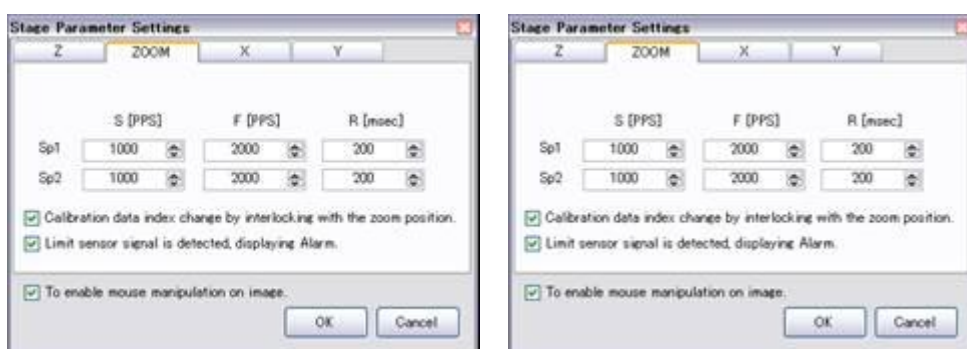
stop the stage operation.

5-5-3 Parameter Setting



Change the speed of each axis and other settings.

In the Z-axis setting screen, it is possible to set the amount for one scroll's worth of movement on the mouse wheel. In the zoom axis, it is possible to choose between enabling and disabling 「Zoom position and Synchronization of Calibration List」. To enable 「display a message to the limit sensor detection」, disable the zoom movement button during limit sensor detection of the zoom axis. You will be asked to define the origin again.



In checking the 「Enabling mouse manipulation」, you will be able to operate the stage in the live image.

Left-dragging the mouse • • • XY axis stage movement

Mouse wheel • • • Z axis stage movement

- ※ The movement amount with regards to the mouse manipulation function is determined by the pre-set calibration setting value (distance of one pixel) and the movement amount per pulse from the stage setting screen.
- ※ This function cannot be used during measurement. Clicking the icon of the item being measured another time will cancel measuring mode..

5-6 Image Processing

5-6-1 Depth Synthesis



Depth synthesis function can be used when our motorized stage is mounted to the Z axis.

It is possible to create an image in focus in all even if there are different objects in focus point in the field of view. A rough 3D shape can be achieved in the 3D viewer in order to display the information regarding the image's height at the same time.

Creating composite image

- 1) Take the picture while the stage is moving upwards by the set amount from 「Drive-resolution」. Start the synthesis process by combining the point of focus on the bottom with the height using the Z axis panel operations, and then pressing the 「Start」 button in the depth synthesis window.
- 2) After starting the synthesis process, 「Processed」 will display the captured number. To end the synthesis process, press 「Stop」 button. The composite image will be displayed in the Image Display window. Since live images are automatically turned OFF, if wanting to save the image, do the save operation and switch to the live display.

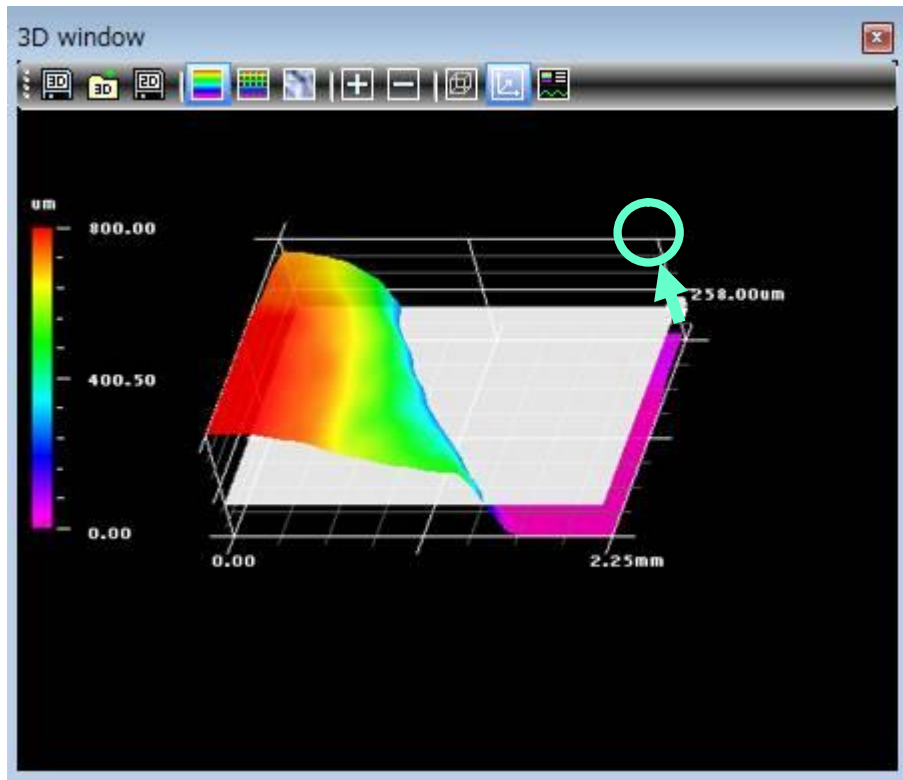


5-6-2 3 D Display



The results of the focus synthesis are displayed in 3D.

It is possible to check any heights by clicking [■], as pinpointed by the arrow in the figure below, and dragging up and down.



3D Window

Description of the icons in the 3D window is as follows.

- save three-dimensional data. The data size is about 13MB.
- read three-dimensional data.
- save three-dimensional data that is currently displayed.
- display gradation.
- display wire frame.
- display texture.
- display expansion – also possible with the mouse scroll
- display reductions – also possible with the mouse scroll.
- reset the position of the display, size and angle.
- switch the coordinate display ON/OFF .
- switch the cross-section display mode ON/OFF..

Cross-section Display Mode

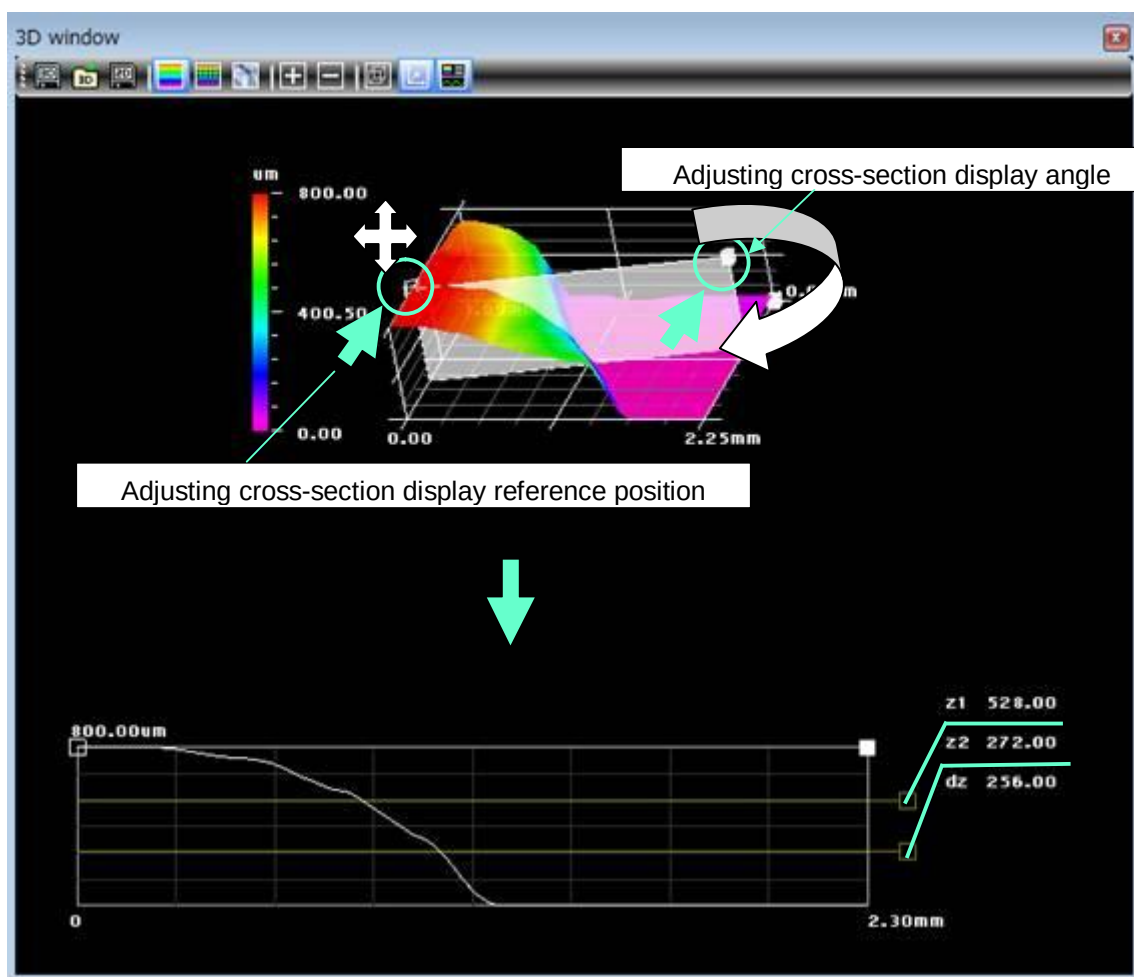
With the mouse, the desired cross-section as well as the height difference between two points within a cross-section can be displayed.

Mouse operations are conducted as shown in the figure below.

Dragging the [□] moved to the top in the 3D image will enable edits to the reference position of the cross-section display.

Dragging the [■] will allow to edit in the angle of the cross-section display.

Dragging the [□] part of the yellow lines in cross-section display profile will allow for edits to the heights of lines Z1 and Z2. The dz value is the difference in height between those two lines $|Z1 - Z2|$.



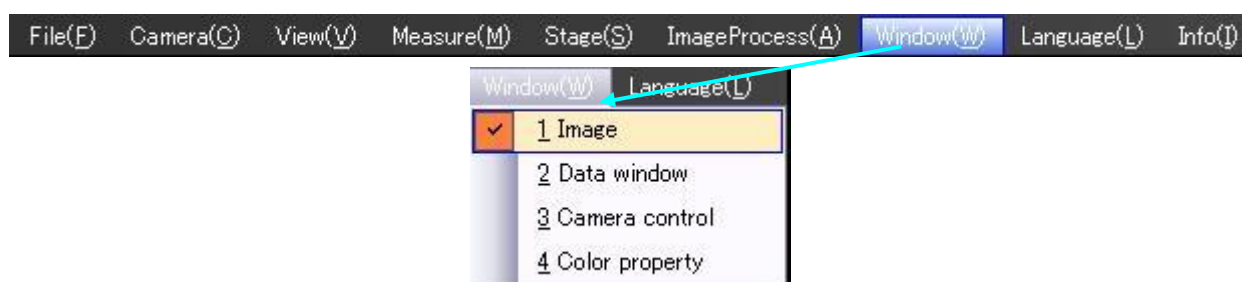
5-6-3 H D R Synthesis



Reductions to image exposure levels can be seen in the image display window when observing the different objects' reflectivity. Since live images are automatically turned OFF, if wanting to save the image, do the save operation and switch to the live display.

5-7 Window Menu

The currently displayed window will be listed in [Window (W)] of the menu bar. It can display the selected window here.



5-8 Information

5-8-1 Version

It can display the version information from the [Information (I)]-[Version Information] of the menu bar.



5-8-2 Registration

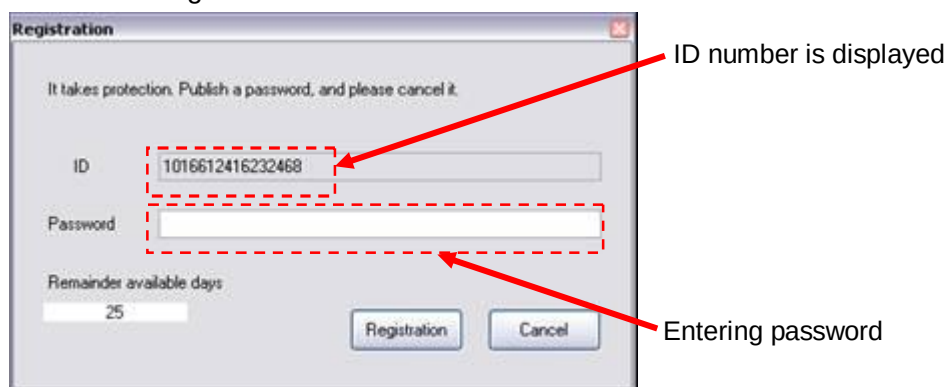
It can display the license registration information from [Information (I)]-[Registration] of the menu bar.



In case of unregistered,

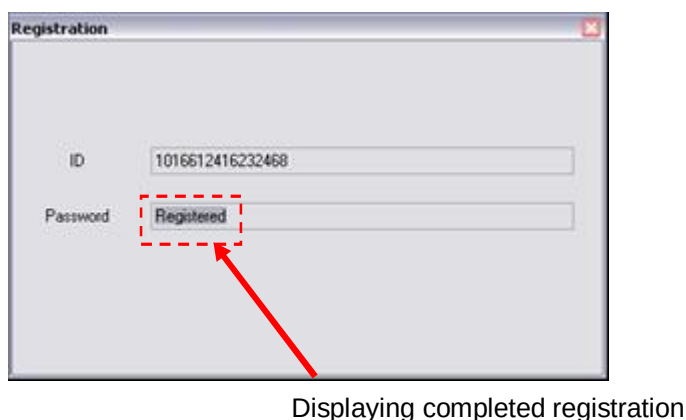
Please follow the procedures of user register according to the steps in 「Regarding 3 software license」.

- 1) ID number is shown in the Registration screen.



- 2) Contact us with the registered ID and obtain the unlock password.

- 3) Enter the obtained password to continue use.



6 Contact US

 **OptoSigma®** <http://www.sigma-koki.com/>

Tokyo Head Office

5F, SIGMA KOKI Tokyo Head office 1-19-9, Midori, Sumida-ku, Tokyo,
130-0021, JAPAN

TEL: +81-3-5638-8228 / FAX: +81-3-5638-6550

E-mail: international@sigma-koki.com

Osaka Branch

6F, TAIYO center building, 4-9-28 Nishi-Nakajima, Yodogawa-ku, Osaka 532-0011

TEL: +81-6-6307-4835 / FAX: +81-6-6307-4834

Kyushu Sales Office

3-17 Hie-machi, Hakata-ku, Fukuoka 812-0014

TEL: +81-92-481-4300 / FAX: +81-92-481-4310