MORITEX
SCHOTT
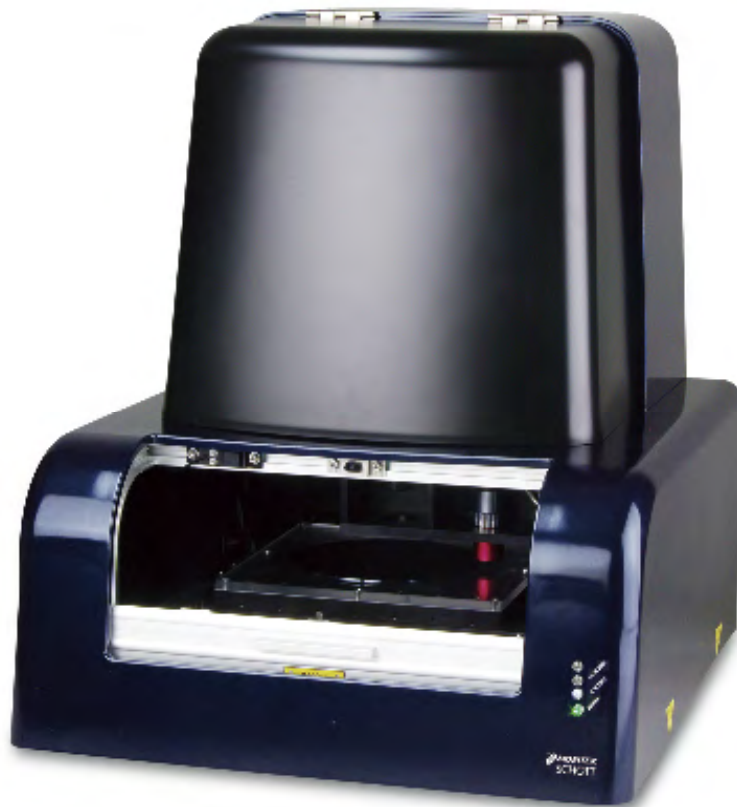

IR-MEMS Inspector

Macro Micro Vision System

User Manual

Please read this user manual before using the product. After reading, keep the manual in a convenient location for future reference.

Before Use

Thank you for purchasing this Moritex product. This manual describes system handling, operation, and precautions. To ensure optimal system performance, read this manual carefully before using the product. Keep the manual in a convenient place for ready reference.
Please contact Moritex if you discover any inaccuracies, ambiguities, or omissions in the manual.
Unauthorized reproduction of the manual in whole or part for third-party use is strictly prohibited. The information provided in this manual is subject to change without notice. Modifying the system or using the system under conditions other than those specified in the manual may impair system functionality and performance. Moritex is not liable for any accidents attributable to such factors.

The system has been manufactured for use in Japan. Safety regulations vary from region to region. Transferring and operating the system and peripheral equipment outside Japan in violation of applicable regulations may be punishable by law.

<u>To Ensure Safe Use</u>

Before use, read the following information carefully and use the system as described.

◆ **Safety symbols used in this manual**

To ensure safety and correct use, the manual uses the following symbols. Carefully read all information accompanying these symbols.

	Danger	Indicates hazardous conditions that may result in death or serious injury to the system operator.

	Warning	Indicates hazardous conditions that may result in health or safety risks to the system operator.

	Caution	Indicates hazardous conditions that may result in damage to the system or facility. This symbol is also used to indicate system operating restrictions.

◆ **Safety symbol labeling on the system**

To ensure safety and correct system use, the following symbols appear on the system itself. Carefully read all information accompanying these symbols.

	Handle with care.	Handle with care to avoid damage to the system or facility.

	Risk of electric shock	Handle with care to avoid electric shock.

	Risk of burns	The system may be hot. Handle with care to avoid burns and other injuries.

	Disassembly prohibited	To avoid damage to the system or facility, do not attempt to disassemble the system unless instructed to do so by the manufacturer.
	Contains moving parts	Keep hands away from moving parts to avoid injury. Stop the device before opening the cover.
	Heavy object	The system is heavy and may cause back injuries if lifted improperly. Have two or more people lift the system together or use lifting equipment.

Operating Precautions to Ensure Safety

◆ General precautions

Using the system in ways not specified in the manual may compromise the safety of the system, facility, and system operators. Carefully follow all instructions given in the manual. Before using any peripheral equipment with the system, carefully read the corresponding equipment user manuals. Make sure you clearly understand the instructions and precautions.

Danger

◆ System operators

To ensure correct use, make sure all system managers and users follow the instructions given in the user manual.
Limit system management and use to individuals who undergone training for the system structure, mechanisms, and controls and system installation, adjustments, operation, and maintenance. Do not allow untrained individuals to use the system.

◆ Operation

- Use only samples or jigs designed specifically for use with the system.
- If the system malfunctions, stop using the system, notify the system manager, and follow instructions given by the system manager.
- Do not attempt to modify the control circuitry without Moritex approval.
- Do not use the system unless the cover is in place.
- If samples break or other problems occur while a stage is in motion, resulting in scattered fragments, stop the stage and clean the system. Sample fragments that catch in the stage guide may damage the system.

⚠ Warning

◆ Installation and storage environment

- Do not install or store the system in environments where oil mist, excessive dust, or explosive atmospheres are present.
- Never place volatile solvents or other combustible substances near the system.
- Do not place objects near the system that block ventilation.

◆ Moving the system

- Always unplug the power cord before attempting to move the system.
- When moving the system, hold the system only at the areas on the side marked Hold Point.

◆ Electric source

- Always unplug the power cord before attempting to inspect or service the system.
- Make sure the power supply matches the system's power supply specifications before turning the system on.
- Unplug the power cord before performing any electrical wiring work. Never attempt this or similar tasks while electric current is flowing.
- Never attempt to perform unauthorized electrical wiring work.
- Safeguard the power cord from damage. Do not place objects on top of the power cord. Do not attempt to modify the power cord.
- When plugging in the power cord, always grasp the cord by the plug. Insert fully into the outlet.
- Always grasp the cord by the plug when unplugging it.
- Do not handle the power cord when your hands are wet.
- Avoid contact with the internal wiring while the system is plugged in.

◆ Operation

Confirm normal system functionality and performance while using the system or after making adjustments. The Initialization screen for the system software should always close without issues.

◆ Emergency

In an emergency, turn off the breaker on back side this machine to stop movement of this system.

◆ Maintenance

- Only individuals with adequate maintenance training should attempt to disassemble or repair the system. Even trained individuals should not attempt to disassemble or repair certain parts. If necessary, contact your Moritex dealer. When plugging in the power cord, always grasp the cord by the plug. Insert fully into the outlet.

- Don't set up the system except exchange of the lamp. System set up has risk of broken this machine.
- There is risk to lose protection function if you don't use our recommended accessories.
- Don't make additional cover on the breaker.
- There is risk of electrification or ignition if you use AC cable that doesn't come with the system.
- There is risk of broken the system or PC if you use USB cable that doesn't come with the system.
- There is risk of broken light source or ignition of the light source if you don't use our recommended lamp.

⚠ Caution

◆ **Installation environment**

The system is a precision instrument. Use only in environments where ambient temperatures are +10 to +40°C, with fluctuations not exceeding ±1°C.
Use the system only in environments where the ambient humidity is 30–60% RH and no condensation occurs. Keep the system out of direct sunlight.
Keep enough space between wall and this machine to turn off the breaker for emergency.

◆ **Moving or transferring the system**

Handle the system carefully during transit to avoid dropping and damage.

1. System Overview and Specifications

1-1 Overview

This system is designed to perform non-contact infrared inspections (including internal inspections) of various samples. It also allows easy processing of the images captured. The system comprises an inspection unit and control computer. The inspection unit consists of a low-magnification lens, high-magnification lens, illumination units, and stage units.
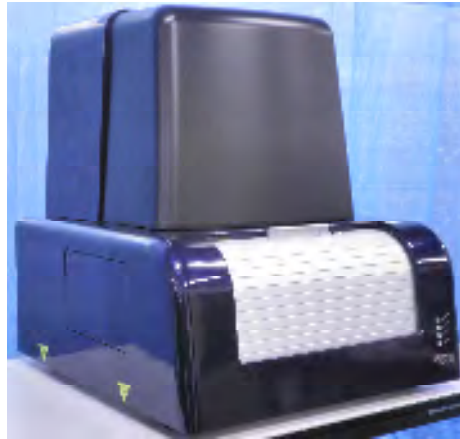

Figure 1-1: System appearance
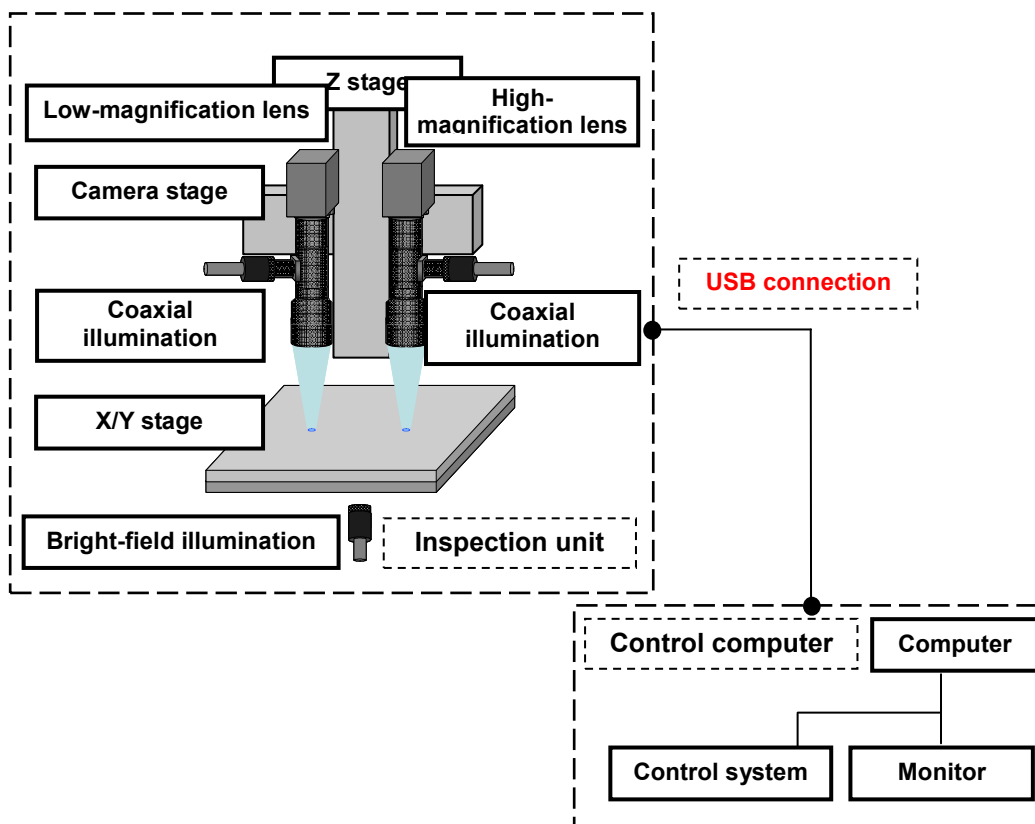
1-2 Structure

Figure 1-2-1 shows the basic system structure.

Figure 1-2: System structure

1-3　System Specifications

Basic system specifications

1-3-1　Environment of use

Environmental conditions are listed in Table 1-3-1.

Table 1-3-1: Environment of use

Item	Specifications
Power supply	100–240V AC ±10%, single-phase
Power consumption	5 A max., with 100V AC
Power supply frequency	50/60 Hz
Operating temperature	+10 to +40°C, with fluctuations not exceeding ±1°C
Operating humidity	30–60% RH, non-condensing
Storage temperature	+10 to +40°C
Storage humidity	30–60% RH, non-condensing

1-3-2　System dimensions, supported sample dimensions

System dimensions and the dimensions of samples that can be inspected are listed in Table 1-3-2.

Table 1-3-2: System dimensions, supported sample dimensions

Item		Specifications
External system dimensions	Width	625 mm
	Height	735 mm, including leveler
	Depth	705 mm
Weight		85 kg
Cover material, color		Plastic, main color: dark blue
Sample sizes supported		Wafers up to 8 inches, 200 mm in diameter

1-3-3　Low-magnification lens specifications

Characteristics of the optical system on the low-magnification side are listed in Table 1-3-3.

Table 1-3-3: Low-magnification lens specifications

Item		Specifications
Camera	Image sensor	1/2-inch, monochrome
	Effective pixels	1.3 megapixels, 1024x1280 (HxW)
Lens	Magnification	approx. 0.75x (min.) to 4.5x (max.)
	Zoom method	Motorized, pulse-driven
	Working distance	approx. 90 mm
Camera field-of-view	At 0.75x	approx. 7.09 x 8.88 mm (HxW)
	At 4.5x	approx. 1.18 x 1.48 mm (HxW)
Image resolution	At 0.75x	approx. 6.93 µm/pixel
	At 4.5x	approx. 1.16 µm/pixel

1-3-4 High-magnification lens specifications

Characteristics of the optical system on the high-magnification side are listed in Table 1-3-4.

Table 1-3-4: High-magnification lens specifications

Item		Specifications
Camera	Image sensor	1/2-inch, monochrome
	Effective pixels	1.3 megapixels, 1024x1280 (HxW)
Lens	Magnification	approx. 7.5x (min.) to 40x (max.)
	Zoom method	Motorized, pulse-driven
	Working distance	approx. 20 mm
Camera field-of-view	At 7.5x	approx. 0.71x0.89 mm (HxW)
	At 40x	approx. 0.13x0.17 mm (HxW)
Image resolution	At 7.5x	approx. 0.69 µm/pixel
	At 40x	approx. 0.13 µm/pixel

1-3-5 Illumination specifications

Specifications of the illumination units are listed in Table 1-3-5.

Table 1-3-5: Illumination specifications

Item			Specifications
Coaxial illumination	Low magnification	Type	LED or halogen
		Wavelength	1000 nm or higher
	High magnification	Type	Halogen
		Wavelength	1000 nm or higher
Bright-field illumination	Both magnifications	Type	Halogen
		Wavelength	1000 nm or higher

1-3-6 Stage specifications

Characteristics of the stages are listed in Table 1-3-6.

Table 1-3-6: Stage specifications

Item		Specifications
X/Y stage	Travel	±100 mm, total: 200 mm
	Method of movement	Motorized, pulse-driven
	Repeat precision	±0.002 mm
	Speed	50 mm/s
	Supported sample	weight 10 kg
Z stage	Travel	100 mm
	Method of movement	Motorized, pulse-driven
	Repeat precision	±0.001 mm
Camera stage	Travel	100 mm
	Method of movement	Motorized, pulse-driven
	Repeat precision	±0.001 mm

1-4   Accessories

Accessories included with the system are listed in Table 1-4.

Table 1-4: Accessories

Item	Quantity
User Manual	1
USB cable, to connect the system and computer (terminated in A and B connectors)	1
System power cord (for 240V AC)	1
CD-ROM with data (user manual, files for software recovery)	1
Sample inspection table (clear plastic, for attachment to the X/Y stage)	1

2. Installation and Storage

2-1 Installation and Storage Precautions

Warning

◆ Installation and storage environment

- Do not install or store the system in environments where oil mist, excessive dust, or explosive atmospheres are present.
- Never place volatile solvents or other combustible substances near the system.
- Do not place objects near the system that block ventilation.

◆ Location of installation and storage

- Do not install or store the system in locations where it may be subject to vibration or impact. For more information on the dimensions of the space required for installation, see Section 2-2. An optional stabilizing platform is available if you are concerned about vibration during inspections. Contact your Moritex dealer for details.

◆ Moving the system

- Always unplug the system before moving.
- When moving the system, hold the system only at the areas on the side marked Hold Point.

Warning

◆ Electric source

- Always switch off primary power before attempting to inspect or service the system.
- Perform any necessary wiring in accordance with the technical standards for the electrical facilities and internal wiring specifications.
- Make sure the power supply matches the system's power supply specifications before turning the system on.
- Never attempt to perform unauthorized electrical wiring work.
- Make sure the system is properly grounded. Failure to ground the system may result in electric shock or short circuits and exacerbate noise problems and resulting system malfunctions.
- Safeguard the power cord from damage. Do not place objects on top of the power cord. Do not attempt to modify the power cord.
- When plugging in the power cord, always grasp the cord by the plug. Insert fully into the outlet.
- Always grasp the cord by the plug when unplugging it.
- Do not handle the power cord when your hands are wet.
- Avoid contact with the internal wiring while the system is plugged in.

⚠ Caution

◆ **Installation environment**

- The system is a precision instrument. Use only in environments where ambient temperatures are +10 to +40°C, with fluctuations not exceeding ±1°C.
- Use the system only in environments where the ambient humidity is 30–60% RH and no condensation occurs. Keep the system out of direct sunlight.
- Keep enough space between wall and this machine to turn off the breaker for emergency.

◆ **Storage environment**

- Store the system in locations where the temperature is +10 to +40°C.
- Store the system in locations where the ambient humidity is 30–60% RH and no condensation occurs. Keep the system out of direct sunlight.

2-2   Installation Space

◆ Space required for system installation

Choose a location that provides adequate space for installation. Refer to Figure 2-2.
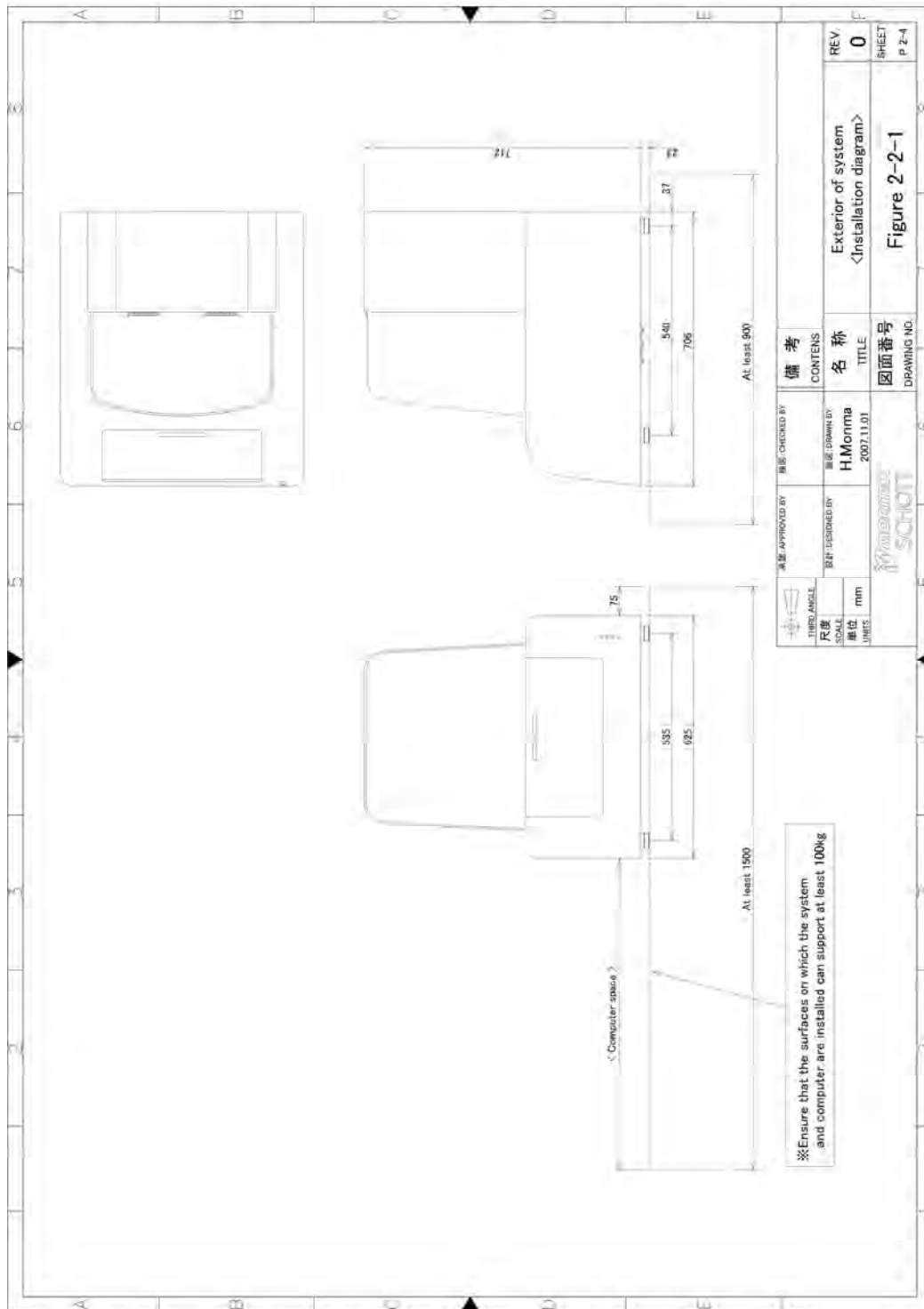
Figure 2-2: System installation space

3. Operations

3-1   System Operations

This section identifies various system components and provides operating instructions.

3-1-1   System parts on the front side

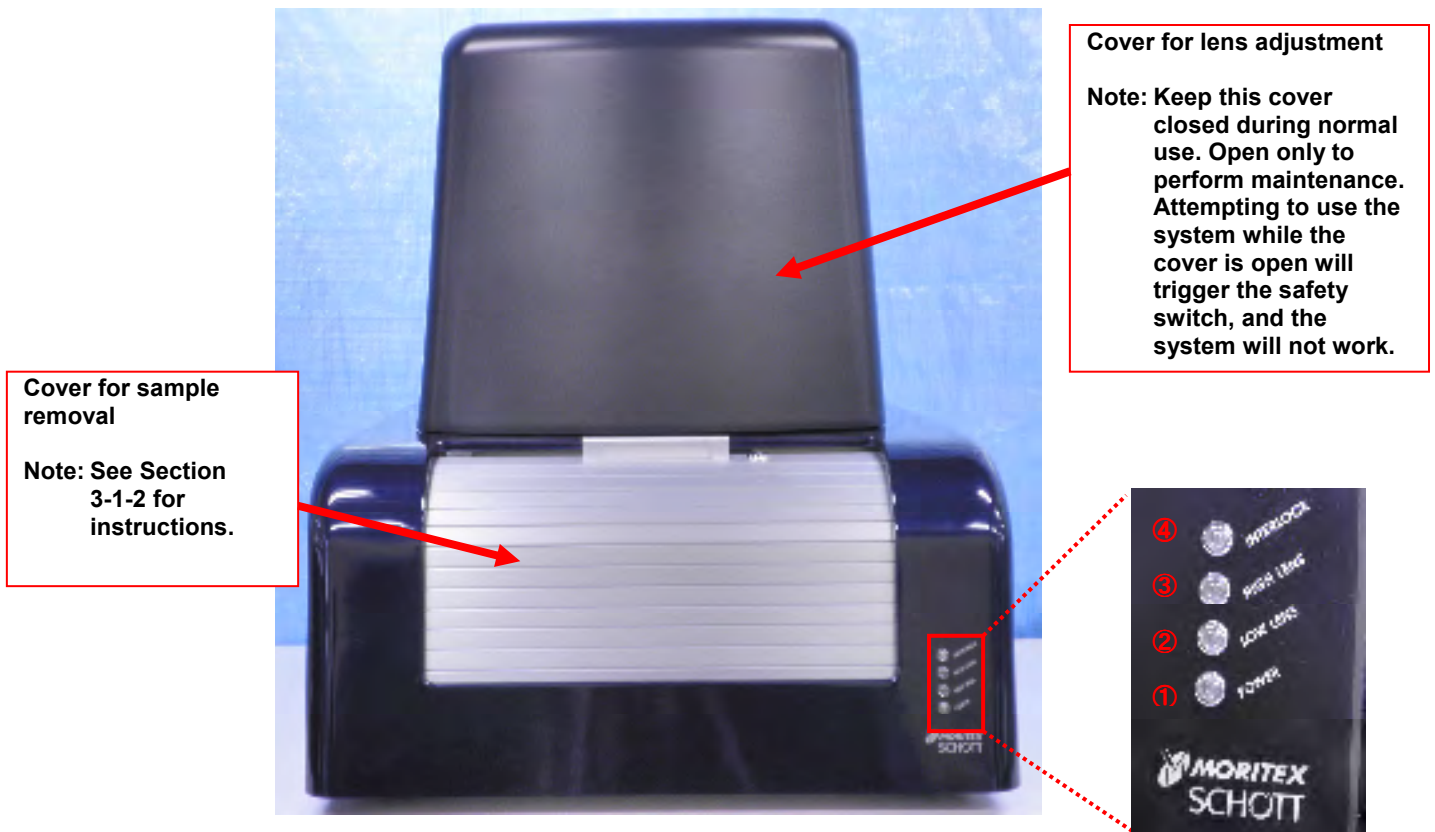The following parts are visible from the front of the system.

Cover for lens adjustment

Note: Keep this cover closed during normal use. Open only to perform maintenance. Attempting to use the system while the cover is open will trigger the safety switch, and the system will not work.

Cover for sample removal

Note: See Section 3-1-2 for instructions.

Figure 3-1-1: Front of system

①: Power indicator
②: Low-magnification indicator
③: High-magnification indicator
④: Interlock indicator

3-1-2   Using the cover for sample removal

Do the following to remove the sample removal:

To open the cover, turn the key (1) to the left to unlock the cover. Grasp the handle (2) and pull the cover down. Slide the cover open.
To close the cover, hold and lift the handle (1), then turn the key (2) to the right to lock.
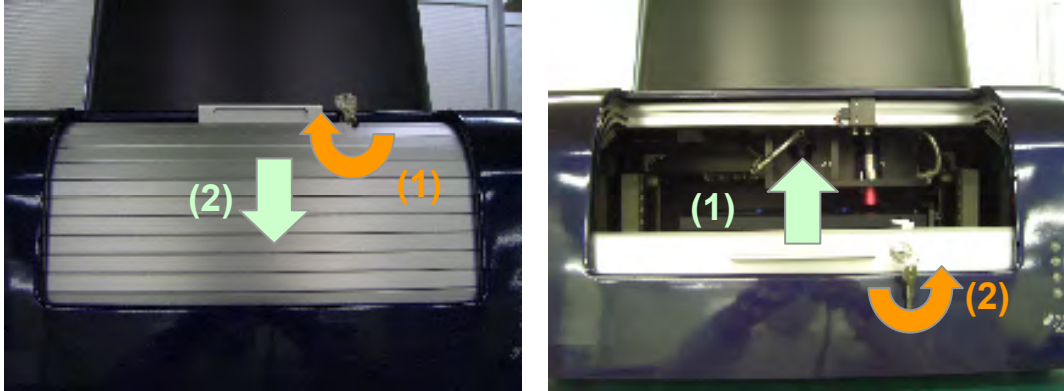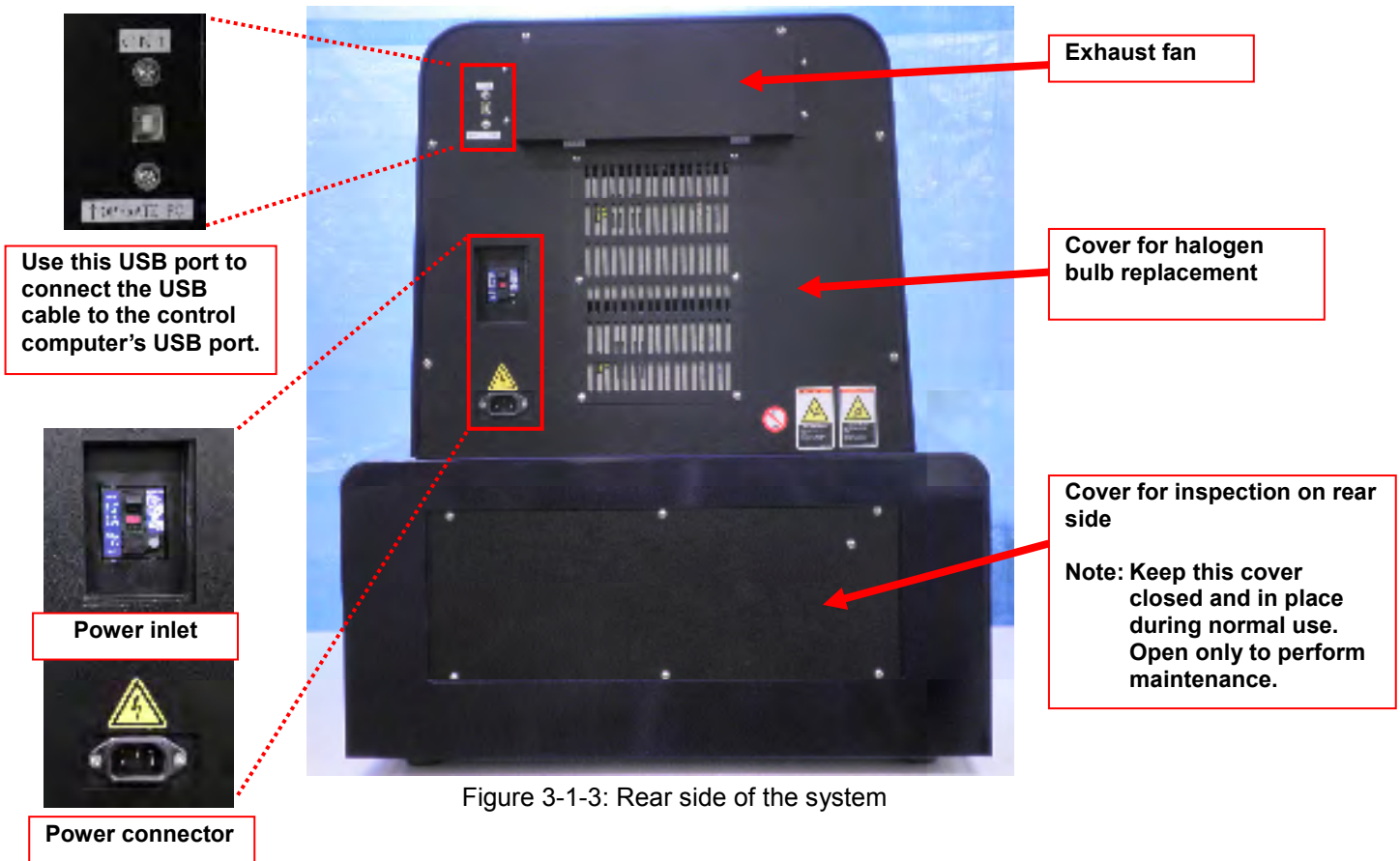
Figure 3-1-2: Cover for sample removal

<Safety switch on the cover for sample removal>
The cover for sample removal incorporates a metal-detecting safety switch. In all cases when the cover is open and in some cases (i.e., cover unlocked) when the cover is closed, the metal-detecting safety switch will be at the Off position. The safety switch disables the X/Y, Z, and camera stages. To ensure operational safety, always close and lock the cover for sample removal before use.

3-1-3   System parts on rear side

The following parts are visible from the rear side of the system.

Exhaust fan

Use this USB port to connect the USB cable to the control computer's USB port.

Cover for halogen bulb replacement

Power inlet

Cover for inspection on rear side

Note: Keep this cover closed and in place during normal use. Open only to perform maintenance.

Power connector

Figure 3-1-3: Rear side of the system

3-1-4   Rear side of the control computer

The following parts are visible from the rear side of the control computer.

Use the USB port next to the IRise sticker.

USB port for system connection

**Note: Use the port marked with the IRise sticker to connect the USB cable.
Using any other port will prevent communication with the system.**

Figure 3-1-4: Rear side of control computer

3-2   System Startup and Shutdown

Do the following to start or shut down the system.
Work carefully. Failure to follow these instructions may result in malfunctions.

3-2-1   Starting up the system

Start up the system as follows:
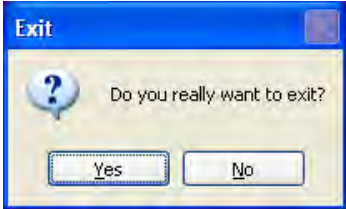
Table 3-2-1: System startup instructions

No.	Item	Description
1	Check power.	Confirm that both the inspection unit and control computer are off.
2	Check the connections.	Confirm that the AC power cords for both the inspection unit and control computer are plugged in. Make sure the inspection unit and control computer are connected via the USB cable.
3	Turn the inspection unit on.	To turn the inspection unit on, flip the power switch of the inspection unit up. The Power indicator will now be lit. (Note: The Low Lens indicator will also be lit.)
4	Turn the control computer on.	Press the power button for the control computer to turn it on. You must turn the inspection unit on before the control computer.
5	Start the dedicated software.	Double-click the shortcut icon on the desktop to launch the dedicated software. <Shortcut icon>
6	Start initialization.	The initialization screen will appear after the dedicated software starts. <Initialization screen (1)>

No.	Item	Description
		Click the Initialize button to start system initialization. <Initialization screen (2)>
7	Use to access the control screen.	Following initialization, the software control screen will appear.

3-2-2   Shutting down the system

Shut down the system as follows:

Table 3-2-2: System shutdown instructions

No.	Item	Description
1	Return the X/Y stage to the shutdown position.	In the dedicated software, return the X/Y stage to the origin (center position). For instructions, see Section 3-3-4, Step 8.
2	Exit the dedicated software.	In the dedicated software, select File → Exit, or click the Close icon (x) in the upper right of the screen.
3	Respond to the confirmation message	The following message window will appear: <Exit confirmation message> Click Yes to exit the dedicated software.
4	Shut down the operating system.	Shut down the operating system, then turn the control computer off.
5	Turn the inspection unit off.	Flip down the power switch for the inspection unit to turn it off.

3-3 Software

The dedicated software is used to control the system.
This section describes the software.

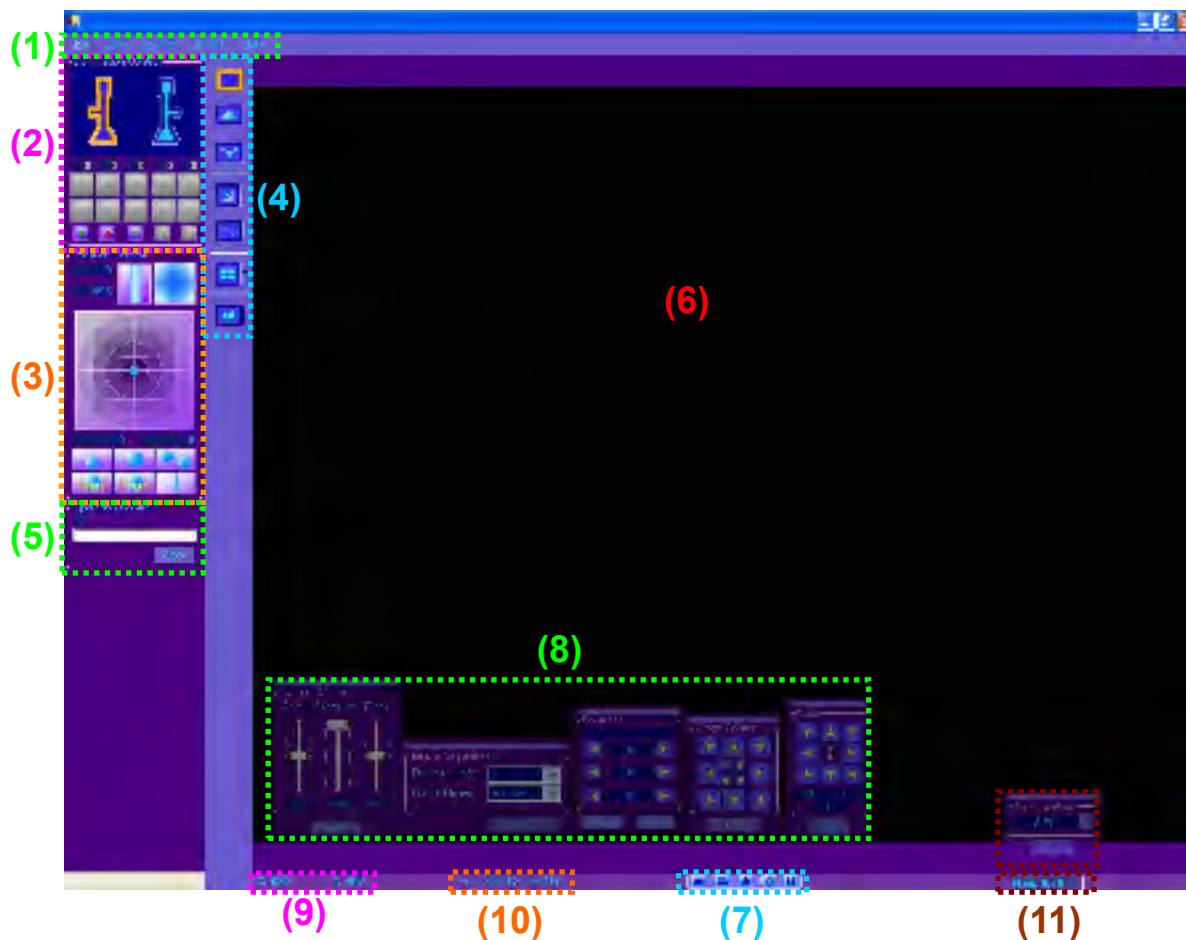## 3-3-1 Screen structure

The screen is organized as follows:

Figure 3-3-1: Screen elements

Table 3-3-1: Description of screen elements

No.	Menu Items	Description
1	Main menus	Selects and executes various commands. ⇒ Functions described in Section 3-3-2
2	Lens and illumination controls	Selects low- or high-magnification lens. Selects or adjusts coaxial, oblique, or bright-field illumination. ⇒ Functions described in Section 3-3-3

No.	Menu Items	Description
3	Area map and stage controls	Indicates the current position of the X/Y and Z stages; enables the following actions by moving the X/Y stage. • Loading (X/Y stage center position) • Unloading • Moving to specific coordinates • Specifying the origin • Moving to the origin • Displaying cross-hairs ⇒ Functions described in Section 3-3-4
4	System utilities	Selects and executes system utilities. • Switching between video and still images for camera images • Selecting enhancement (image sharpening) • Selecting shading (brightness uniformity) • Selecting calculation of rectangular area or circular diameter • Selecting calculation of distance between two points • Selecting stitching (combining images) • Selecting Step Shot processing (optional) ⇒ Functions described in Section 3-3-5
5	Operational control	Indicates stitching progress and gives the option to halt processing. ⇒ Functions described in Section 3-3-6
6	Camera image display area	Shows images captured by the camera. ⇒ Functions described in Section 3-3-7
7	Navigation functions	Configures system utilities and various stage movements. • Configures camera adjustments • Configures image display integration and averaging • Configures enhancement (image sharpening) • Configures X/Y and Z stage jog movements • Configures lens magnification • Configures X/Y and Z stage step movements ⇒ Functions described in Section 3-3-8
8	Navigation setting screens	Use to access the setting screen for the current navigation function. The setting screen lets the user reposition to a point within the camera image display area. ⇒ Functions described in Section 3-3-9
9	Image coordinates	Use to display spatial coordinates for the cursor position. ⇒ Functions described in Section 3-3-10
10	Field of view for the image	Indicates the field of view for captured images. ⇒ Functions described in Section 3-3-11
11	Image magnification	Indicates the magnification factor for captured images. ⇒ Functions described in Section 3-3-12

3-3-2　Main menu

The Main menu items are described below.

Table 3-3-2: Description of main menu

No.	Menu Items	Description
1	File	Use to save image data or exit the software. ⇒ Functions described in Section 3-3-2A
2	View	Use to access system utility and stage movement setting screens. ⇒ Functions described in Section 3-3-2B
3	System	Use to access system utility setting screens. ⇒ Functions described in Section 3-3-2C
4	Utilities	Use to access calibration functions (optional).
5	Help	Use to view software version and other basic information.

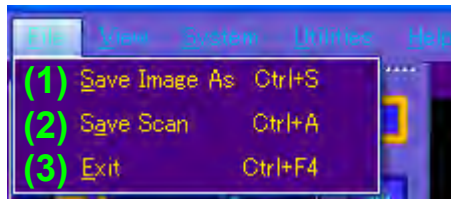## ◆ 3-3-2A: File menu
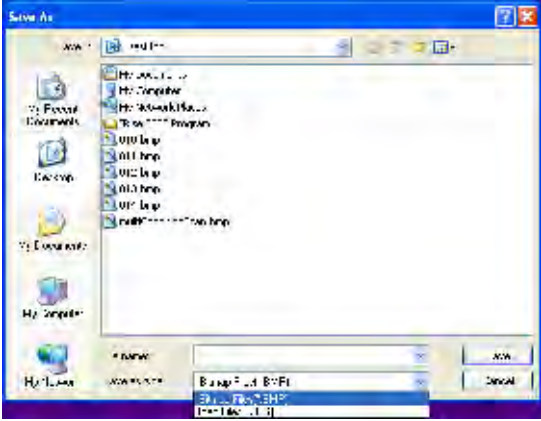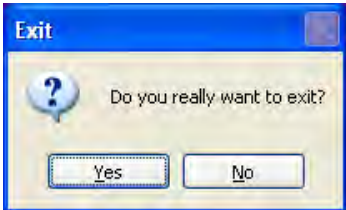
The File menu items are described below.

Table 3-3-2A: Description of File menu

No.	Menu Items	Description
1	Save Image As	Saves image data. Choose BMP or JPG as the format. <Saving images> (1) Select Save Image As… from this menu. (2) The screen shown here will appear. (3) Enter the desired file name in the File name field. (4) Choose the desired file type by selecting Save as type, then click the Save button to save the image data.

No.	Menu Items	Description
2	Save Scan	Saves image data acquired from stitching. Images are saved in BMP format. <Saving images> (1) Select Save Scan from the menu. (2) The screen shown here will appear. (3) Click the New Folder button to create a new folder in which to save image data. (4) Choose any name and location for destination folders. (5) After choosing the destination folder, click the OK button to save the image data.
3	Exit	Closes the software. Select this menu item to display the following screen. <Exit confirmation message> Click Yes to exit the software.

◆ **3-3-2B: View menu**

The View menu items are described below.

Table 3-3-2B: Description of View menu

No.	Menu Items	Description
1	Navigator	Use to access the parameters screen for X/Y and Z stage jog movements and for lens magnification. For information on configuring parameters, see Section 3-3-9D.
2	Step Controller	Use to access the parameters screen for X/Y and Z stage step movement. For information on configuring parameters, see Section 3-3-9E.
3	Enhancer	Use to access the enhancement parameters screen. For information on configuring parameters, see Section 3-3-9C.
4	Zoom Controller	Use to access the zoom setting screen for the lens. For information on configuring the setting screen, see Section 3-3-12.

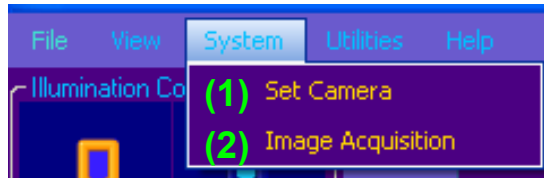## ◆ 3-3-2C: System menu

The System menu items are described below.

Table 3-3-2C: Description of System menu

No.	Menu Items	Description
1	Set Camera	Use to access the parameters screen for camera adjustments. For information on configuring parameters, see Section 3-3-9A.
2	Image Acquisition	Use to access the parameters screen for image integration and averaging. For information on configuring parameters, see Section 3-3-9B.

3-3-3　Lens and illumination controls

See below for a detailed description of the lens and illumination controls.
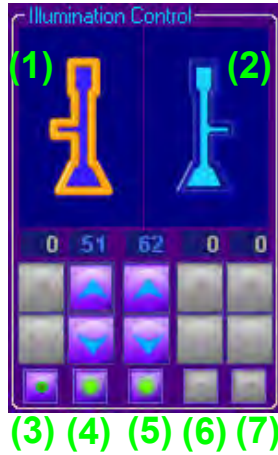

Table 3-3-3: Description of lens and illumination controls

No.	Option	Description
1	Select the low-magnification lens	This selects the low-magnification lens. To switch to the low-magnification lens, double-click the lens icon. The icon for the current lens appears in yellow; the lens not currently in use is blue.
2	Select the high-magnification lens	This selects the high-magnification lens. To switch to the high-magnification lens, double-click the lens icon. The icon for the current lens appears in yellow; the lens not currently in use is blue.
3	Select or adjust intensity of low-magnification coaxial illumination	This selects low-magnification coaxial illumination or adjusts the intensity. For information on configuring parameters, see Section 3-3-2A.
4	Select or adjust intensity of low-magnification oblique illumination	This selects low-magnification oblique illumination or adjusts the intensity. For information on configuring parameters, see Section 3-3-2A.
5	Select or adjust intensity of oblique illumination at both magnifications	This selects oblique illumination and adjusts the intensity at both magnifications. For information on configuring parameters, see Section 3-3-2A.
6	Select or adjust intensity of high-magnification oblique illumination	This selects high-magnification oblique illumination or adjusts the intensity. For information on configuring parameters, see Section 3-3-2A.
7	Select or adjust intensity of high-magnification coaxial illumination	This selects high-magnification coaxial illumination or adjusts the intensity. For information on configuring parameters, see Section 3-3-2A.

◆ **3-3-3A: Configuring illumination parameters**

See below for a detailed description of the illumination parameters.

(3)

(2)

<When selected illumination is off > **(1)** <When selected illumination is on>

Table 3-3-3A: Configuring illumination parameters

| No.	Option	Description
1	Illumination On/Off button	Activates or deactivates illumination. Click the circle icon to activate (enable) the selected source of illumination. Click again to deactivate illumination. Active illumination is indicated by a yellow-green icon. Inactive illumination is indicated by a green icon. A red icon indicates intensity has dropped below a specific level because the lamp has dimmed with extended use. This is a prompt to replace the lamp.
2	Buttons for intensity adjustment	Increases or decreases illumination intensity. Click the up or down arrow icons to adjust intensity. Adjustment is not possible when illumination is off. Active illumination is indicated by blue arrow icons. Inactive illumination is indicated by grayed-out icons.
3	Illumination intensity	Indicates the current intensity as a value within the range of 0–100. The value appears in blue when illumination is on and in gray when illumination is off.

3-3-4 Area map and stage controls

See below for a detailed description of the area map and stage controls.

Table 3-3-4: Description of area map and stage controls

No.	Option	Description
1	Z-stage coordinate	Indicates the coordinate of the current Z stage position in μm. A coordinate of 0 corresponds to the origin (center) Z-stage position. Positive values correspond to points above this position; negative values correspond to points below.
2	Coordinate of magnification	Indicates the relative coordinate of magnification at the current position. A coordinate of 0 represents the narrowest field of view. A coordinate of 1000 represents the widest field of view (during low- or high-magnification alike).
3	Z-stage map	Shows a map on which a blue lens icon indicates the current Z-stage position. The icon moves up or down as the Z stage moves up or down.
4	Magnification map	Shows a map with the current field of view for the camera image display indicated by a blue ■ icon, which expands or contracts as the lens zooms to expand or shrink the field of view.
5	X/Y-stage map	Shows a map with the current X/Y-stage position indicated by a blue ■ icon, which moves as the X/Y stage is moved along the X or Y axes. This ■ icon can be dragged to any desired coordinates.
6	X/Y-stage coordinates	Indicates the coordinates of the current X/Y-stage position in μm, with the X coordinate shown at left and the Y coordinate to the right. A coordinate of 0 represents the origin (center) X/Y-stage position. For the X-axis, positive values are to the right of the origin and negative values are to the left. For the Y-axis, positive values are forward from the origin and negative values are backward.
7	Unloading button	Facilitates sample loading and unloading by automatically moving the X/Y stage to the position nearest the user (+100 mm on the Y-axis).
8	Loading button	Facilitates preparing for inspection by automatically moving the X/Y stage to the origin (center) position. This can also be used during inspection to return the X/Y stage to the origin.
9	Move to specific coordinate button	Move the X/Y-stage to specific coordinate, after entering the desired coordinates directly into the X/Y-stage coordinate fields (Item 6; described above).
10	Register origin button	Register 0,0,0 as the current X/Y- and Z-stage coordinates. The current 0,0,0 positions will be overwritten each time you click this button.
11	Move origin button	Move the X/Y stage to the position registered using the register origin button described in item 10. If no position has been registered, this button works the same as the loading button described in item 8.
12	Cross-hairs button	Display a cross-hairs icon in the center of the camera image. Click this button to toggle between displaying/hiding the cross-hairs.

3-3-5　System utilities

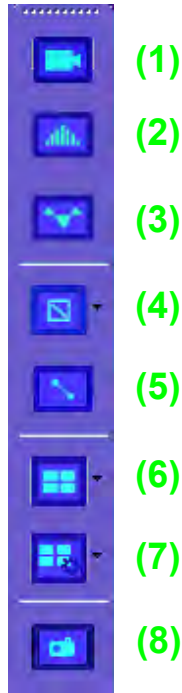See below for a detailed description of the system utilities.

Table 3-3-5: Description of system utilities

No.	Option	Description
1	Toggle camera image button	Click to toggle between video and still images. Video is indicated by a yellow button outline and still images by a blue outline.
2	Enhance (sharpen image) button	Enhance camera images. While image processing is underway, the button will be outlined in yellow. To cancel processing, click the button once again. (The button outline will change to blue.) For information on configuring the enhancement parameters screen, see Section 3-3-8.
3	Shade (uniform brightness) button	Apply shading to camera images. Shading is an easy way to obtain uniform image brightness, based on the determined difference between light and dark image areas. While image processing is underway, the button will be outlined in yellow. To cancel processing, click the button once again. (The button outline will change to blue.)
4	Calculate rectangular area/circular diameter button	Calculate the area of a rectangle and the diameter of a circle in the camera image. While image processing is underway, the button will be outlined in yellow. To cancel processing, click the button once again. For calculation instructions, see Section 3-3-5A.
5	Calculate distance between points button	Calculate the distance between two points in the camera image. While image processing is underway, the button will be outlined in yellow. To cancel processing, click the button once again. For calculation instructions, see Section 3-3-5B.

No.	Option	Description
6	Stitch (combine images) button	Provides a complete view for images by scanning images at the current lens magnification across a specific area and combining the resulting images. For stitching instructions, see Section 3-3-5C.
7	Refining image button	Do following to refine after stitching. It is also possible to refine after enlarging. For refining instructions, see Section 3-3-5D.
8	Step Shot processing button (optional)	Activate, deactivate, or configure Step Shot processing, which works with stage movement at regular intervals (see Section 3-3-9E) to save camera images automatically. When Step Shot processing is active, the button will be outlined in yellow. To cancel processing, click the button once again. (The button outline will change to blue.) For Step Shot instructions, see Section 3-3-5E.

◆ **3-3-5A: Calculating rectangular area or circular diameter**

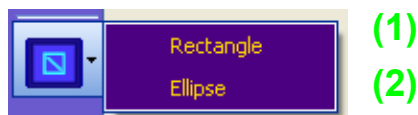Do the following to calculate rectangular area or circular diameter.

(1)
(2)

Table 3-3-5A: Description of calculating rectangular area or circular diameter

No.	Option	Description
1	Rectangular area	Show the area of a rectangle in the camera image.
2	Circular diameter	Show the diameter of a circle in the camera image.

<Instructions>
 (1) Select either Rectangle or Ellipse from the menu.
 (2) To view the rectangular area and circular diameter, specify two points (the starting and ending points) that define the area. Always specify the first point in the upper left (shown by a red dot in the figure) and the second point in the lower right (shown by a blue dot). Note that you must continue to hold down the mouse button after specifying the first point; release the mouse button after specifying the second point.
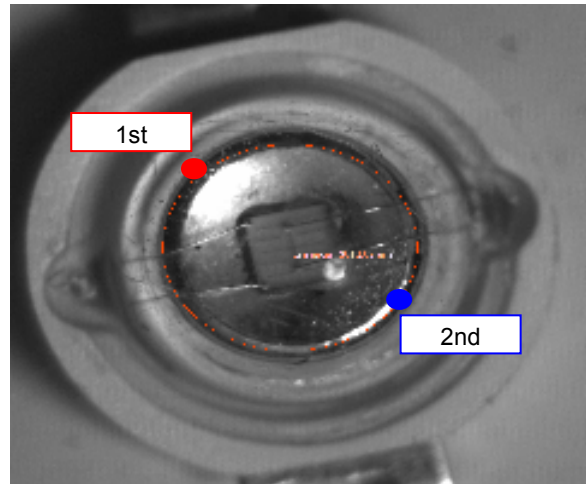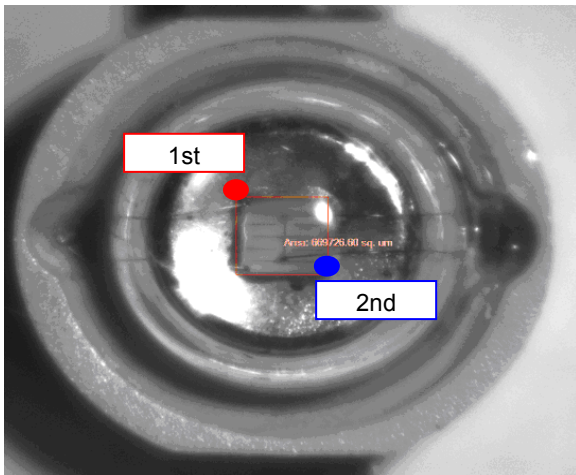
Figure 3-3-5A (1): Calculating rectangular area

Figure 3-3-5A (2): Calculating circular diameter

◆ 3-3-5B: Calculating distances between two points

Do the following to calculate the distance between two points:

<Instructions>

(1) You must specify starting and ending points to view the distance between two points.
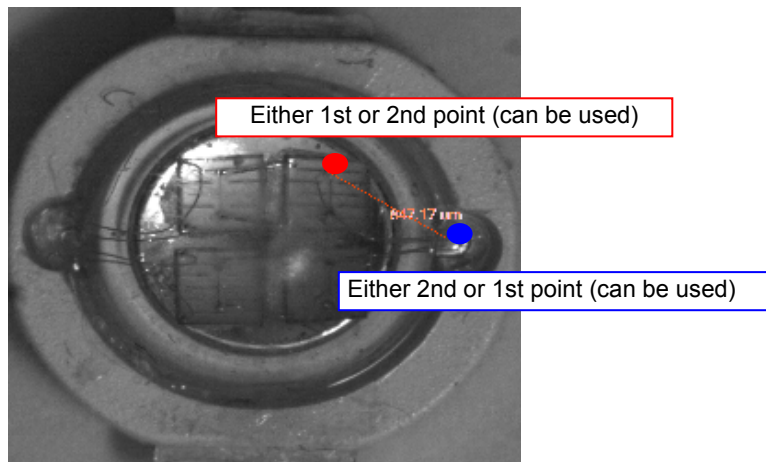In this case, the first and second point can be anywhere on the image.

Figure 3-3-5B: Calculating distance between points

◆ 3-3-5C: Stitching images

Do the following to stitch images:

	(1)
	(2)
	(3)
	(4)
	(5)
	(6)

Table 3-3-5C: Description of image stitching

No.	Option	Description
1	25x25 mm scan	Scan and combine images across a 25 mm² area, centered on the X/Y stage.
2	50x50 mm scan	Scan and combine images across a 50 mm² area, centered on the X/Y stage.
3	100x100 mm scan	Scan and combine images across a 100 mm² area, centered on the X/Y stage.
4	150x150 mm scan	Scan and combine images across a 150 mm² area, centered on the X/Y stage.
5	200x200 mm scan	Scan and combine images across a 200 mm² area, centered on the X/Y stage.
6	Free scan	Scan and combine images across a user-specified area, centered on the current position of the X/Y stage.

☆ Instructions (for areas measuring 25–200 mm²)

(1) Place a sample for image stitching at the center of the X/Y stage.
(2) Check the camera image to confirm that the magnification is set to 0.75x.
(3) Adjust image parameters (illumination, enhancement, shading) while monitoring the camera image.
(4) Select the scanning area from the menu to perform image stitching.
(5) The images from each scan are now combined in the camera image display area. Stitching is complete when all images across the display area have been combined.
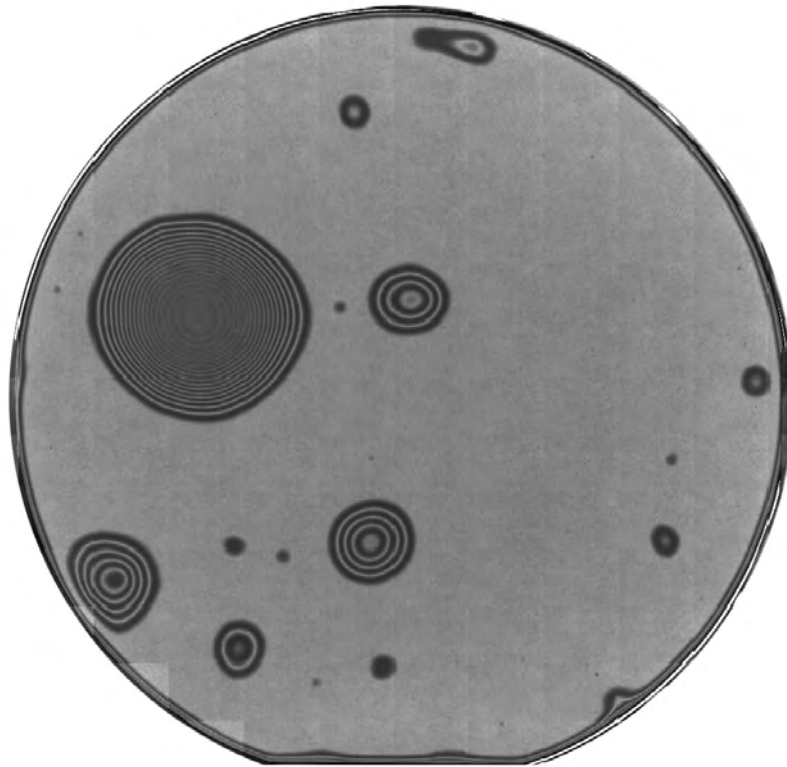

Figure 3-3-5C: Image following stitching

☆ Instructions (for user-specified areas)

(1) Place a sample for image stitching at the center of the X/Y stage.
(2) Check the camera image and move the stage so that the center of the sample is visible.
(3) Adjust image parameters (magnification, illumination, enhancement, shading) while monitoring the camera image.

(4) Select Free from the menu.
    The following screen will appear.

(5) Specify the area to scan by entering values for X and Y, then click the Start button.
(6) The images from each scan are now combined in the camera image display area. Stitching is complete when all images across the display area have been combined.

☆ Options after stitching: Enlarging specific areas

After stitching, two methods are available to enlarge a portion of the image.

<Method A: Specifying the image area to enlarge>
(1) Specify the area you want to enlarge on the stitched image.
(2) To define the area, specify two points (the starting and ending points). Always specify the first point in the upper left (shown by a green dot in the figure) and the second point in the lower right (shown by an orange dot). Note that you must continue to hold down the mouse button after specifying the first point; release the mouse button after specifying the second point.
(3) The area specified is now outlined in blue. In this area, a round red button appears in the lower left and a round blue button in the lower right. (See Figure 3-3-5CA.)
(4) To use the blue frame for image enlargement and to begin image stitching, click the round blue button in the lower right.
(5) To adjust the blue frame or to cancel enlargement, click the round red button in the lower left. The outline is now cleared.
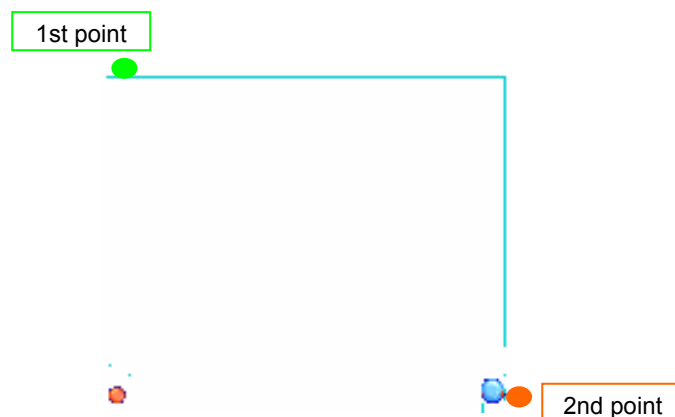

Figure 3-3-5CA: Enlarging specific areas

<Method B: Enlarging stitched images into a camera image>
(1) Specify a point on the stitched image you want to use as the center of the image.
(2) To indicate the point, place the cursor at the position for enlargement and left-click.
(3) The point specified by the cursor will be outlined in light blue. A round red button will appear in the lower left and a round blue button in the lower right. (See Figure 3-3-5CB.)
(4) To use the blue frame for image enlargement and create a camera image with its center at that light blue frame, click the round blue button in the lower right.
(5) To adjust the blue frame or to cancel enlargement, click the round red button in the lower left. This will clear the outline.

Figure 3-3-5CB: Enlarging a point into a camera image

☆ Options after stitching: Shortcut menu after enlarging specific areas

After enlarging a specific area, you can use the shortcut menu to revert to the original stitching screen. Right-click to access the following shortcut menu:

Table 3-3-5C-2: Description of shortcut menu

No.	Option	Description
1	Return to Full Scan	Select this menu option to revert to the original display of the stitched image.
2	Cancel	Select this menu option to cancel the menu operation and dismiss the shortcut menu.

☆ Options after stitching: Refine image

Do following to refine after stitching. It is also possible to refine after enlarging.

① Right-click stitching image and select refine from menu .
② Select one of image stitching image as back ground.   It is good for back ground image
③ Refine starts. There are 3 modes for refine setting. Please see 3-3-5D how to set refine mode.

Figure 3-3-5CC:Refine menu

☆ Options after stitching: Shortcut menu for after enlarging and refining

After enlarging a specific area and after refining stitching image, you can use the shortcut menu to revert to the original stitching screen. Right-click to access the following shortcut menu.
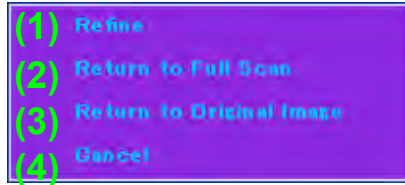

Table 3-3-5C-3: Shortcut menu

No.	Option	Description
1	Refine	Reselect back ground image to refine stitching image. If there is refined image on the screen, you can't select this option. Please select "Return to Original image" to back original image. Then you can select "refine".
2	Return to Full Scan	Select this menu option to revert to the original display of the Full Scan image. (Only for after enlarging)
3	Return to Original Image	Select this menu option to revert to original display of the stitched image. (Only for after refining)
4	Cancel	Select this menu option to cancel the menu operation and dismiss the shortcut menu.

◆ 3-3-5D: Setting for refining image

Do following to set refine mode.

Table 3-3-5D: Refine setting

No.	Option	Description
1	Set Operation	Select mode for selecting back ground image. Automatically Noise reduction level is preset fix value (100). After selecting back ground image, there is no setting menu for noise reduction. Manually After selecting back ground image, there is setting menu for noise reduction. Please see following how to set noise reduction level.
2	Set Shading Model	You can set back ground image for shading model from image file. Please see following how to set back ground image.
3	Grayscale Transformation	You can set input and output range for grayscale transformation. Please see following how to set grayscale transformation.

☆ **Set Shading Model**

Table 3-3-5D-1: Setting menu for shading model

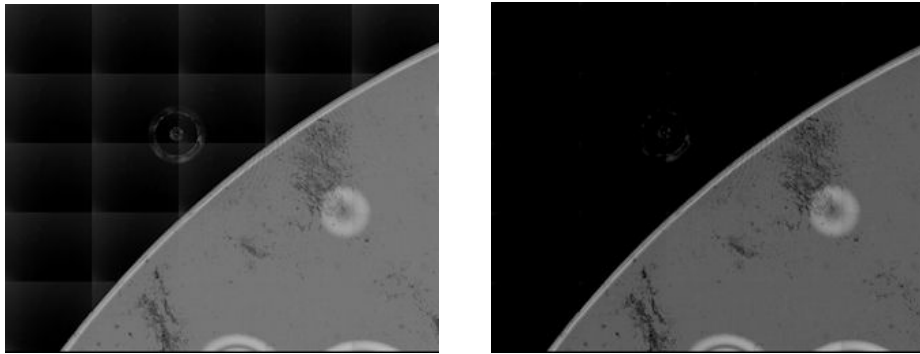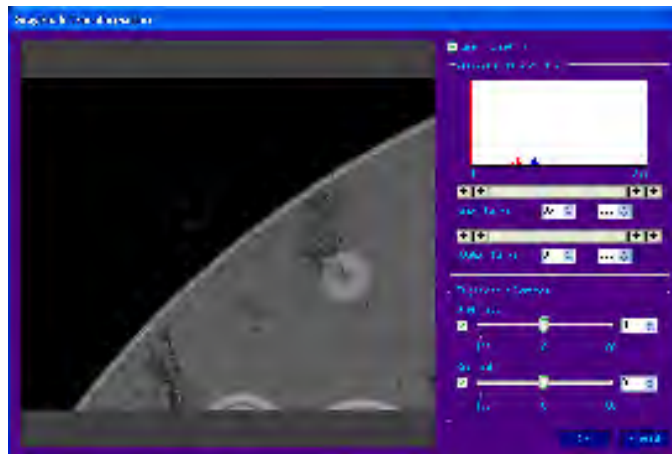| No.	Option	Description
1	Denoising Size Limit	Set noise reduction level from 2 to 1280. Bigger noise level has higher noise reduction effect. Please choose moderate noise reduction level (e.g. 100) on the slide bar. You can check back ground image after noise reduction on the menu. If you don't check "Background Denoising", you can't set noise level and there is no noise reduction on the back ground image.
2	Save Image	You can save back ground image after noise reduction as
3	Back Ground Image	You can select back ground image. Please click "…", then you can choose back ground image from your BMP files.
4	Use This Setting	If you want to use same back ground image on all stitching image, please check this box. Then, after select "Refine", there is no setting menu for back ground image.

☆ Grayscale Transformation

Figure 3-3-5D: Grayscale Transformation

Table 3-3-5D-2: Grayscale Transformation

No.	Option	Description
1	Histogram	There are histograms for original image and image after Grayscale Transformation.
2	Input output setting	You can set input and output range. Each ranges are from "0" to "255".
3	Brightness / Contrast	You can set brightness and contrast. Each values are from "-100" to "100".
4	Set This Setting	If you want to use same "Grayscale Transformation" setting on all stitching image, please check this box. Then, after refining, there is no setting menu for "Grayscale Transformation".

◆ 3-3-5E: Step Shot instructions (optional)

Do the following for Step Shot processing:
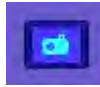
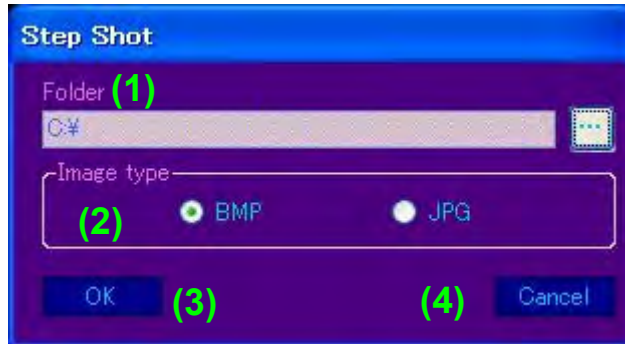When this button is blue, click the button to access the following setting screen:

Table 3-3-5E: Description of Step Shot processing setting screen

No.	Option	Description
1	Image destination folder selection	Specify the folder in which you want to save images. Click the Browse button on the right to access the following screen. Select a folder and click the OK button. The file path to your folder will appear in Folder.
2	Image format selection	Select the file format for the saved images. Choose BMP or JPG.

| No.	Option	Description
3	Start Step Shot processing button	Once you have specified options in (1) and (2), click this button to close the setting screen and activate Step Shot processing. The button will turn yellow. While the button is yellow, camera images will be saved automatically based on the Stage step movement settings. For more information, see Image-saving operations below.
4	Cancel Step Shot processing button	Click this button to close the setting screen. Step Shot processing is canceled.

☆ Image-saving operations

During Step Shot processing, camera images are saved as processing occurs, based on the Stage step movement settings.

<Operations>

(1) In the navigation functions ▣ ▣ ▣ ▣ ▣ click the right-most button.

The following Stage step movement parameters screen will appear:
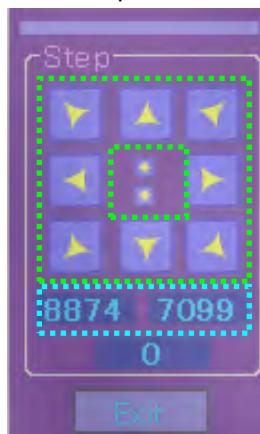
(2) In the fields outlined in light blue, enter the increment along the X and Y axes by which you want to move the sample before each shot.
(3) In the controls outlined in green, click the desired step movement button for the X/Y stage. If Step Shot processing is underway when you click a button, the system will save the image before your click, then move the X/Y stage in the direction specified.
(4) Repeat step 3 as needed.

(5) When finished, click the ▣ button once again. The button now appears in blue.

The display turns blue when Step Shot processing stops.

(6) Image files are saved to the folder indicated in Folder with a serial number (starting with 1) appended to the file name.

3-3-6   Operational control

See below for a detailed description of the operational control display and interaction.
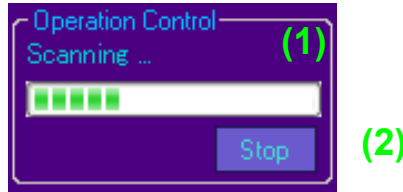

Table 3-3-6: Description of operational control

No.	Option	Description
1	Stitching progress indicator	Shows the progress of stitching. Stitching is complete once the green progress bar reaches the right end of the display area.
2	Stop stitching button	Use to stop stitching, if necessary. Image scanning and X/Y stage movement will stop at the current position. To resume inspection, return to the first step and resume the actions indicated by the instructions.

3-3-7   Camera image display area

Shows the camera image acquired by the low- or high-magnification lens.

3-3-8   Navigation functions

See below for a detailed description of the navigation functions.

Table 3-3-8: Description of navigation functions

No.	Option	Description
1	Button for configuring camera adjustments	Use to access the parameters screen for camera adjustments. For information on configuring parameters, see Section 3-3-9A.
2	Button for configuring image display integration and averaging	Use to access the parameters screen for image integration and averaging. For information on configuring parameters, see Section 3-3-9B.
3	Button for configuring enhancement (image sharpening)	Use to access the enhancement parameters screen. For information on configuring parameters, see Section 3-3-9C.
4	Button for configuring X/Y and Z stage jog movement and lens magnification	Use to access the parameters screen for X/Y and Z stage jog movement and for lens magnification. For information on configuring parameters, see Section 3-3-9D.
5	Button for configuring X/Y and Z stage step movement	Use to access the parameters screen for X/Y and Z stage step movement. For information on configuring parameters, see Section 3-3-9E.

3-3-9　Navigation setting screens

See below for a detailed description of the navigation setting screens.
For information on accessing these screens, see Section 3-3-8.

◆ 3-3-9A: Configuring the camera adjustment parameters screen

Do the following to configure settings in the camera adjustment parameters screen.

Table 3-3-9A: Description of camera adjustment parameters screen

No.	Option	Description
1	Camera gain setting	Adjust camera sensitivity as needed. Specify a value in the range from -6 to +6, with 0 as the baseline setting. Specifying positive values will increase sensitivity but increase noise. Specifying negative values will reduce sensitivity but reduce image noise.
2	Camera exposure setting	Adjust camera exposure as needed. Specify a value in the range of 0–255. Specifying higher values will produce brighter images, but at the cost of longer image capture times. Specifying lower values will produce darker images but make acquisition faster.
3	Camera black setting	Adjust camera contrast as needed. Specify a value in the range from -30 to +30, with 0 as the baseline setting. Specifying positive values will produce brighter images at the cost of lower contrast. Specifying negative values will produce darker images but with higher contrast.
4	Exit button	Closes the parameters screen.

◆ **3-3-9B: Configuring the image integration and averaging parameters screen**

Do the following to configure settings in the image integration and averaging parameters screen.

Table 3-3-9B: Configuring image integration and averaging parameters

No.	Option	Description
1	Setting for the number of images used for image integration and averaging	Specify the number of times to perform image capture as the basis for image integration and averaging. Choose 1, 2, or 4. Specifying 1 will produce unprocessed images. <Optional> When the system is configured for extended functionality, the available range of times for image capture is 1–16. In this case, if you choose Additive image integration, you can specify 1–16 image captures. If you specify Average image averaging, five levels are available: 1, 2, 4, 8, or 16.
2	Image integration selection—Additive	Select Additive to prepare the system for image integration. Either 2 or 4 camera images will be combined to produce bright images even if individual images are dark.
3	Image averaging selection—Average	Select Average to prepare the system for image averaging. Either 2 or 4 camera images will be combined to reduce noise even if individual images are noisy.
4	Exit button	Closes the parameters screen.

Note: Only one of image integration or image averaging is available.

◆ 3-3-9C: Configuring the enhancement parameters screen

Do the following to configure settings on the enhancement parameters screen.

Table 3-3-9C: Configuring enhancement parameters

No.	Option	Description
1	Function being configured	Identifies the function currently being configured.
2	Setting for dark images (Use to emphasize Dark)	Use to emphasize dark images. Specify positive values for a stronger effect or negative values for a weaker effect.
3	Setting for bright images (Use to emphasize Bright)	Use to emphasize bright images. Specify positive values for a stronger effect or negative values for a weaker effect.
4	Overall image brightness setting (Enlarge Dark Area)	Use to emphasize the entire image under the conditions specified in items 2 and 3. Specify positive values to produce darker images and negative values to produce brighter images.
5	Reset button	Restores the default enhancement values (0,0,0). No image enhancement is performed at the default settings.
6	Exit button	Closes the parameters screen.

<Description of Enhancement>
The following illustrative images help demonstrate some basic ideas of image enhancement.
(See Figure 3-3-9C.)
On a histogram with a central brightness of C, the function described in Item 2 targets pixels
darker than C (indicated by A). The function described in 3 targets pixels brighter than C
(indicated by B). In each bright area, image brightness is adjusted toward (+) or (-) for image
emphasis.
Additionally, the central brightness of C on the histogram can be adjusted (+) or (-) for overall
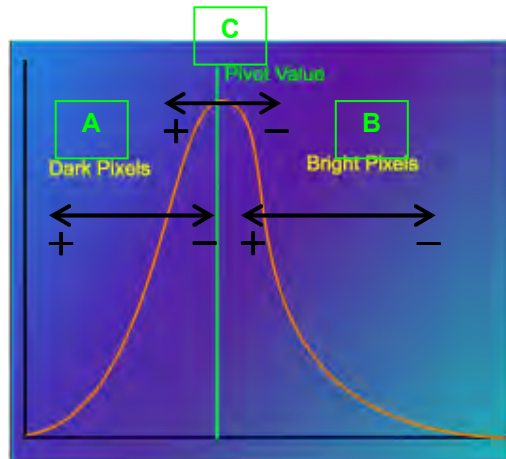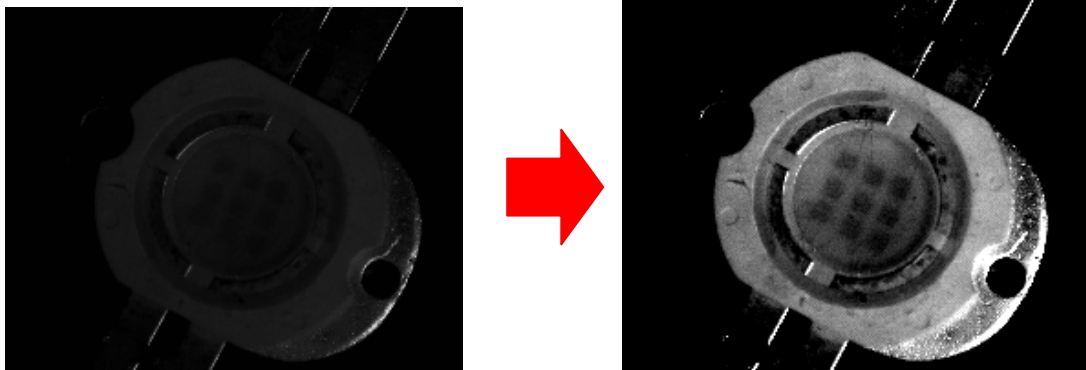image emphasis to produce images with higher contrast.

Figure 3-3-9C: Example of image enhancement

◆ **3-3-9D: Configuring the stage jog movement and lens magnification parameters screen**

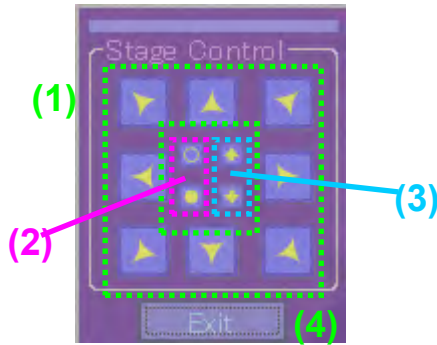Do the following to configure settings on the stage jog movement and lens magnification parameters screen.

Table 3-3-9D: Configuring stage jog movement and lens magnification parameters

No.	Option	Description
1	X/Y stage jog movement setting	Jogs movement of the X/Y stage in a certain direction. The direction indicated by the arrow icons corresponds to the direction of movement on the screen. Thus, the X/Y stage actually moves in the direction opposite the arrow icons.
2	Lens magnification setting	Adjusts lens magnification. To increase magnification (and reduce the field of view), click the ○ icon; to reduce magnification (and enlarge the field of view), click the ● icon. These controls are available with both the low and high-magnification lens. You can also adjust magnification as described in Section 3-3-12.
3	Z stage jog movement setting	Jog movement of the Z stage in each direction. The direction indicated by the arrow icons corresponds to the direction of Z-stage movement. This is used to set the desired working distance (focal position) for the sample being inspected.
4	Exit button	Closes the parameters screen.

- **<OPTION>: Jog movement operations for a rotating stage**

  If the system is equipped with an optional rotating stage, the stage jog movement and lens magnification parameters screen will also feature buttons for controlling the rotating stage.
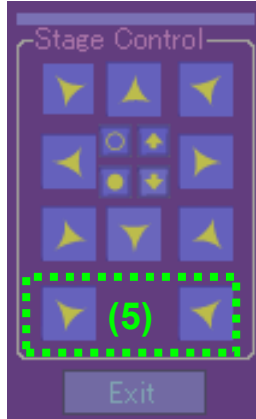

Table 3-3-9D-2: Description of optional stage jog movement and lens magnification parameters

No.	Option	Description
5	Rotating stage jog movement setting	Jogs movement of the rotating stage left and right. The direction indicated by the arrow icons corresponds to the direction of rotation of the stage. This is used to set the optimal orientation of the sample being inspected.

◆ **3-3-9E: Configuring settings on the stage step movement parameters screen**

Do the following to configure settings on the stage step movement parameters screen:
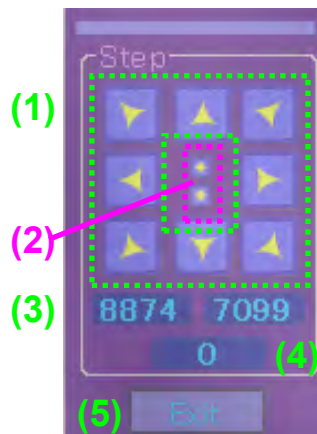
Table 3-3-9E: Configuring stage step movement parameters

No.	Option	Description
1	X/Y stage step movement setting	Sets the step movement of the X/Y stage in each direction. The direction indicated by the arrow icons corresponds to the direction of movement on the screen. Thus, the X/Y stage actually moves in the direction opposite the arrow icons.
2	Z stage step movement setting	Step movement of the Z stage up or down. The direction indicated by the arrow icons corresponds to the direction of Z-stage movement. This is used to arrange the desired working distance (focal position) for the sample being inspected.
3	X/Y stage step travel setting	Configures the distance of X/Y stage travel for step movement. Enter the travel value directly in μm. The default value displayed is based on the current field of view on the screen.
4	Z stage step travel setting	Configures the distance of Z stage travel for step movements. Enter the value directly in μm.
5	Exit button	Closes the parameters screen.

- **<OPTION>: Step movement operations for rotating stage**

If the system is equipped with an optional rotating stage, the stage step movement parameters screen will feature buttons for controlling the rotating stage.
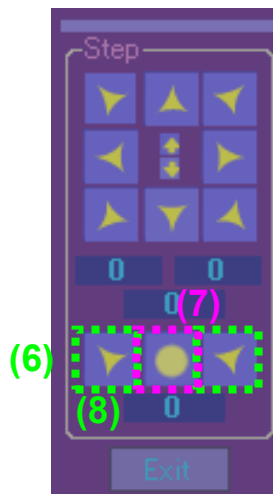

Table 3-3-9E-2: Description of optional stage step movement parameters

No.	Option	Description
6	Rotating stage step movement setting	Sets left and right step movements. The direction indicated by the arrow icons corresponds to the direction of rotation of the stage. This is used to arrange the desired orientation for the sample being inspected.
7	Rotating stage 0° movement setting	Moves the rotating stage to the 0° position. This is used to return the rotating stage to the default position.
8	Rotating stage step movement setting	Configures the amount of rotating stage travel for step movement. Enter the travel value directly, in 1/100° increments.

3-3-10 Image coordinate display

See below for a detailed description of the image coordinate display.

(1) X: 1066   Y: 869

Table 3-3-10: Description of image coordinates display

No.	Option	Description
1	Image coordinates	Placing the cursor in the camera image display area will show the spatial coordinates for that position. The upper right of the camera image display area is the origin (0,0), and the lower right is the maximum coordinate value (1066,869). These spatial coordinates are only used by the dedicated software.

3-3-11 Image field of view display

See below for a detailed description of the image field of view display.

(1) Area: 8875.63 , 7100.53

Table 3-3-11: Description of image field of view display

No.	Option	Description
1	Field of view for the image	Indicates the field of view for captured images. The field of view changes with magnification. Note: The field of view shown is intended only to provide a general feel for the actual field of view.

3-3-12 Image magnification display

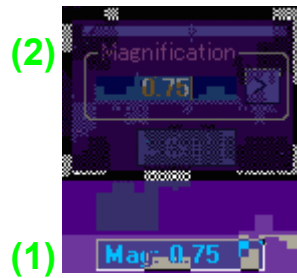See below for a detailed description of the image magnification.

Table 3-3-12: Description of image magnification display

No.	Option	Description
1	Image magnification display	Indicates the magnification factor for captured images. For more information on adjusting magnification, see Section 3-3-9D. Note: The size of magnification is intended only to provide a general feel for the actual field of view.
2	Image magnification setting	To configure magnification, click the indicated image magnification. After entering the desired magnification, click the arrow button to apply the magnification. You can also adjust magnification as described in Section 3-3-9D.

4. Maintenance and Troubleshooting

4-1   Maintenance

The system requires the following regular maintenance.

4-1-1   Check illumination intensity

Check the intensity against a reference sample prepared for maintenance purposes.
Replace the halogen bulb if the intensity has significantly diminished.
You can also contact your Moritex dealer to request a replacement.

4-1-2   How to change the lamp

⚠ Danger

Before replacing the halogen bulb, turn the system off and give the bulb sufficient time to cool.
The lamp will still be very hot immediately after the system is turned off. Contact during this time may result in burns.

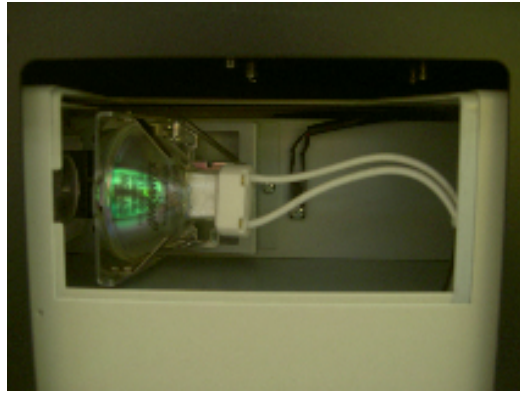Step 1 : Turn off the system.

Step 2 : Open the cover for halogen bulb replacement on the back side of this machine.
        (Ref P3-4)

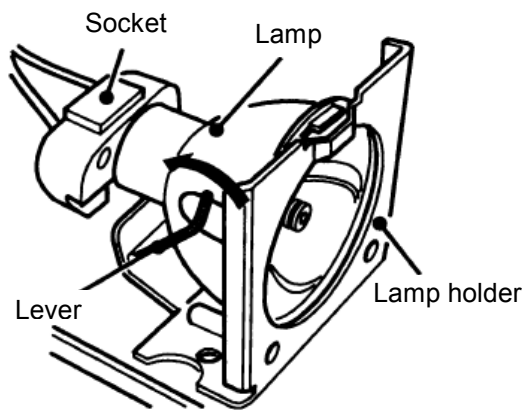Step 3 : Open lamp cover on light source.

Turn the latch to "OPEN".

Step 4 : After open the lamp cover, you can access to halogen bulb.

Step 5 : Move the lever like arrow sign on following figure.

Socket   Lamp

Lever

Lamp holder

Step 6 : Take out halogen bulb form lamp holder. After that, take out the bulb from the socket. That time, hold the socket with your hand.

Step 7 : Return the lever to original position. Then, put new halogen bulb on lamp holder. That time, set the projection of halogen bulb and the dent of lamp holder. After that, connect halogen bulb on lamp socket.

Lamp

Projection of halogen bulb

Dent of lamp holder

Lamp holder
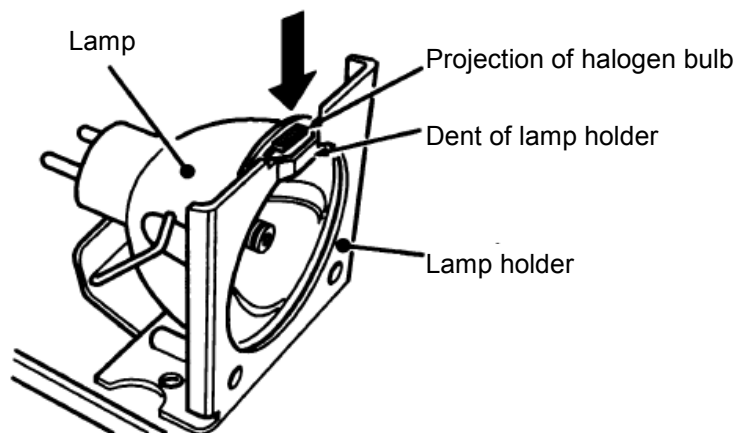
Step 7 : Return the cover of light source to original position. Then, turn the latch to "CLOSE". After that, return the cover for halogen bulb replacement to original position.

4-1-3   Image zoom calibration

The system incorporates an image calibration function.
This function requires an optional calibration wafer with a pattern of holes measuring 125 µm in diameter.

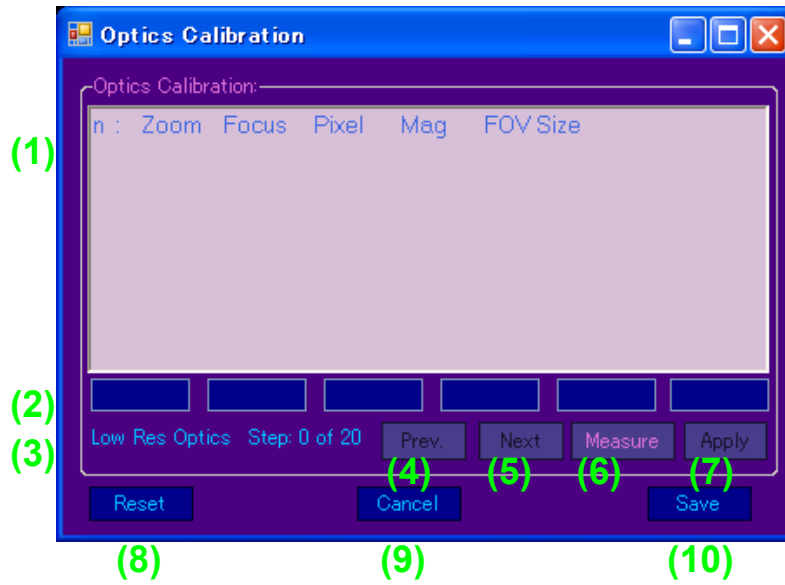Select "Utilities" > "Optics Calibration" to display the following screen:

Table 4-1-2: Description of image zoom calibration screen

No.	Option	Description
1	Calibration data	Lists current calibration data. • n: data number • Zoom: zoom step value • Focus: Z-axis step value • Pixel: pixel size • Mag: zoom magnification • FOV Size: dimensions of field of view
2	Measurement data	Indicates measurement data after you click the "Measure" button. Each item corresponds to the items in "Calibration data" above.
3	Step	Indicates the measurement data number. Measurement is performed 21 times (numbered 0–20).
4	Prev. button	Use to view the previous measurement data number.
5	Next button	Use to view the next measurement data number.
6	Measure button	Measure the calibration wafer and displays the results in "Measurement data."
7	Apply button	Apply the values in "Measurement data" to items in "Calibration data" and go to the next measurement data number.
8	Reset button	Clear current calibration data.
9	Cancel button	Cancel calibration without saving the data.
10	Save button	Save the current calibration data and exit calibration. This button also applies the calibration data.

<Instructions>
    (1) Set the magnification to 0.75x and prepare the optional calibration wafer.
    (2) Focus on the 125 µm holes on the calibration wafer and click the "Measure" button to make a measurement.
    (3) The system automatically switches to the next magnification for measurement.
    (4) Zoom measurement consists of 21 steps. At each step, click the "Measure" button to perform a measurement, then repeat the tasks in (2).
    (5) After all measurements are complete, click the "Apply" button to record the data.
    (6) Finally, click the "Save" button to apply the calibration results.

4-2   Consumables

✧ Consumables

Table 4-2: List of consumables

Item	Model Number	Quantity	Notes
LE D for coaxial illumination	MCE L-CIR8-AD-1070	1	Useful life: Approx. 5,000 hours
Halogen bulb for coaxial illumination	LM-100-IR	1	Useful life: Approx. 1,000 hours
Halogen bulb for bright-field illumination	LM-100-IR	1	Useful life: Approx. 1,000 hours

<Precautions>
(1) Listed consumables must be purchased, and requesting replacement will incur a fee.
(2) Quantities indicated are the quantities of these consumables in the system.
(3) Actual useful life may be shorter than the reference values indicated, depending on the environment of use.
(4) Note that extra time may be required for the delivery of some consumables.
(5) Thank you for understanding that some consumables may go out of production in the future.

4-3   Troubleshooting

If problems arise, try the troubleshooting tips given below.
If problems persist, contact your Moritex dealer.

◆ **The system will not turn on.**

✦   Is power being supplied to the system?
✦   Is the power cord fully plugged in?
✦   Is the power cord damaged?
✦   Do the electrical specifications match those required by the system? (See Section 1-3.)

<Solution>
Confirm that the problem does not involve the power supply or power cord. Confirm that the power specifications match those required by the system (100V AC, single-phase).

◆ **The control computer will not start up.**

✦   Are the control computer and monitor power cords plugged in?
✦   Did you turn the monitor on?

<Solution>
Confirm that the problem does not involve the power supply or power cord. Confirm that the monitor is on.

◆ **I see a warning message when the software starts up.**

✦   Does the following message appear when the system software starts up?

✦   Did you connect the USB cable correctly to the designated USB port for the control computer on the rear side of the system?
✦   Did you turn on the control computer before turning on the system?

<Solution>
Click the "OK" button for all error messages, then click the "Exit" button on the initialization screen to exit the software. Turn the system and control computer off, make sure the USB cable is connected to the correct port, then restart the system in the correct sequence.

<Cause of Problem>
This problem occurs at software startup if the USB cable is not connected to the correct USB port or if the system is not on.

◆ **The device driver is not recognized.**

✧ Does the following message appear when the system software starts up?
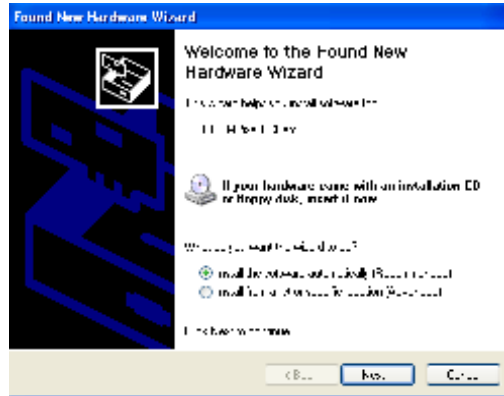
✧ Did you connect the USB cable to the designated USB port for the IRise system on the rear side of the control computer?

<Solution>
Click the "Cancel" button for all driver messages. Turn the system and control computer off, make sure the USB cable is connected to the correct port, and restart the system in the correct sequence.

<Cause of Problem>
This problem occurs on software startup if the USB cable is not connected to the correct USB port. A software safeguard function will prevent use with other computer or USB ports.

5. Warranty

5-1   Warranty

1. Warranty period: One year after delivery
   We agree to repair the system at no cost in the event of failure during the warranty period despite use in accordance with instructions provided in the user manual or by a Moritex service technician.

2. The system will be repaired for a fee during and after the warranty period for issues occurring under conditions other than those indicated in 1 above. Contact your Moritex dealer for service fee information. These repairs and services apply in the following cases, even during the warranty period:
   - Failure or damage due to incorrect use or misuse of the system or unauthorized repairs or maintenance by customers
   - Damage attributable to moving or transferring the system by customers following the initial installation
   - Failure or damage attributable to severe voltage fluctuations, fire, earthquakes, floods, or other natural disasters
   - Use in countries in which the system was not designed to operate
   - Replacement of consumables
   - Issues or failure attributable to use of parts purchased from sources other than a Moritex dealer

3. To request repair or purchase parts after the warranty period, contact your Moritex dealer.