



Nikon

ShuttlePix Digital Microscope

**P-400Rv/P-400R Digital Microscope
P-MFSC Motorized Focusing Stand Controller
P-TPM Touch Panel Monitor**

Instructions

Preface

Thank you for purchasing a Nikon product.

This instruction manual is written for users of the Nikon P-400Rv/P-400R Digital Microscope, P-MFSC Motorized Focusing Stand Controller, and P-TPM Touch Panel Monitor.

To ensure correct usage, read this manual carefully before operating the product.

- No part of this manual may be reproduced or transmitted in any form without prior written permission from Nikon.
- The contents of this manual are subject to change without notice.
- The equipment described in this manual may differ from the actual product in its appearance.
- Although every effort has been made to ensure the accuracy of this manual, errors or inconsistencies may remain. If you note any points that are unclear or incorrect, please contact your nearest Nikon representative.
- Some of the equipment described in this manual may not be included in the set you have purchased.
- If you intend to use any other equipment with this product, read the manual for that equipment too.
- If you intend to use the P-400Rv/P-400R Digital Microscope alone after removing it from the P-MFSC Motorized Focusing Stand Controller, see the “P-400Rv Digital Microscope Instructions” manual or “P-400R Digital Microscope Instructions” manual supplied separately.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Symbols used in this manual

This manual uses the following symbols for special purposes.



This icon marks precautions or information that should be observed for safety. Depending on the severity of the risk, “WARNING” and “CAUTION” are indicated together with this icon.



This icon marks cautions or information that should be read before use, to prevent damage to this product and loss of data.



This icon marks notes or information that should be read before use. It also marks tips or additional information that may be helpful when using this product.

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Features of This Product

The Nikon ShuttlePix Digital Microscope contains a 20x optical zoom lens.

This system is composed of the P-400Rv or the P-400R, motorized stand, stage and touch panel monitor. The P-400Rv/P-400R can be removed and used as a handheld digital microscope or it can be assembled in the motorized stand and used as a stationary digital microscope.

Images captured on the touch panel monitor can be easily saved to recording media, such as USB memory, etc. Images can be measured with simplified measurement or comments can be added to the images using the touch panel.

- **Removable camera head**

The P-400Rv/P-400R can be removed from the stand and used as a handheld digital microscope. The P-400Rv/P-400R is equipped with an illumination unit and an LCD monitor, enabling microscopic observation and photography without cable connection.

- **20x optical zoom**

A 20x high magnification zoom lens is installed, which enables not only capturing an image of an entire specimen at low magnification but also capturing a more detailed image at high magnification.

- **Internal LED ring illuminator**

A LED ring illuminator is mounted on the tip of the P-400Rv/P-400R. Oblique illumination is also available by switching the illumination pattern.

- **High-quality photography**

The same image processing engine as used in the Nikon Compact Digital Camera series is installed. (P-400Rv/P-400R)

- **Motorized stand**

The motorized stand has the control panel on the front of the base which enables most control operations such as motorized vertical movement (focusing), zoom magnification switching, light area switching, light control, capturing, and EDF image (all in-focus image) capturing.

- **Three kinds of stages**

The P-S32 3x2 Stage, P-SSL Sliding Stage and P-STR Tilting Stage are provided.

- **Touch panel monitor**

The 17-inch touch panel monitor enables live observation of an image and reproduction of the captured image. A comment can be added and simplified measurement can be performed on the image, etc. by simple operations mainly using the buttons.

- **Variety of capturing functions**

EDF (extended depth of field) images, HDR (high dynamic range) images and images with halation removed can be captured.

- **Interval shooting**

A specified number of shots can be automatically and continuously captured at a specified interval. How the object changes over time can be seen and images can be captured while changing the capturing conditions.

- **Simplified measurement on the screen**

Distance, angle and circumference of a circle can be measured briefly by operation on the screen.

- **Network function**

When this system is connected to a PC network, images can be obtained by accessing this system from a PC and transferred via FTP from this system.

- **Dedicated application**

By installing the dedicated application and loading the captured images, operations such as simplified measurement and image conversion can be performed. 3D image display and contour display are also available based on the height data generated at the time of EDF image capturing.

Configuration of This Manual

1

Names of Components

Describing the names of major components and the configuration of this system.

2

Preparing for Use

Describing how to assemble this system and preparations for observing and capturing images.

3

Basic Operations of the System

Describing the basic operations of this system and the operations from the panel on the stand.

4

Operating the EASY Menu

Describing how to observe and capture images with simple operations in the [EASY MENU].

5

Operating the MAIN Menu

Describing how to observe and capture images in the desired conditions in the [MAIN MENU].

6

Playing Back and Deleting Images

Describing how to play back and delete the image already captured.

7

Using Annotation and Simplified Measurement

Describing how to add a note to images and perform simplified measurement on images.

8

Changing Initial Settings

Describing initial settings of this system.

9

Direct Printing

Describing how to connect a PictBridge-compliant printer and to print out images from a printer.

10

Connecting with PC

Describing how to connect this system with a PC.

11

Connecting to Network

Describing how to use this system with a PC connected to a network.

12

Troubleshooting

Describing items to check if trouble occurs, meaning of the messages and actions to take.

13

Daily Maintenance

Describing how to maintain this system

14

Major Specifications

This chapter lists the major specifications of this system.

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Safety Precautions

To ensure correct and safe operation, read this manual before using this product.

WARNING and CAUTION Symbols

Although this product is designed and manufactured to be completely safe during use, incorrect usage or failure to follow the safety instructions provided may cause personal injury or property damage. To ensure correct usage, read this manual carefully before using this product. Do not discard this manual and keep it handy for easy reference.

Safety instructions in this manual are marked with the following symbols to indicate their importance. For your safety, always follow the instructions marked with these symbols.

Symbol	Description
 DANGER	Disregarding instructions marked with this symbol will lead to serious injury or death.
 WARNING	Disregarding instructions marked with this symbol may lead to serious injury or death.
 CAUTION	Disregarding instructions marked with this symbol may lead to injury or property damage.

**WARNING (for the overall product)****1. Purpose of this product**

This product is designed to be used for microscopic observation and photography, and for displaying and editing the captured images.

2. Read this manual carefully.

For your safety, read carefully this manual and other manuals supplied with the products that will be used together with this product. Be sure to read and observe the warnings and cautions described at the beginning of each manual.

3. Do not disassemble, repair, or modify this product.

Do not attempt to disassemble, repair, or modify this product. Doing so may result in electric shock or failure. Any failure or damage caused by such action will not be covered under warranty. Never attempt to disassemble, repair, and modify any part of this product which is not described in this manual. If you notice any problems with this product, contact your nearest Nikon representative.

4. If the inside of this product is exposed due to breakage, never touch the exposed area.

If this product is broken due to falling, etc. and the inside is exposed, do not touch the exposed area. Doing so may cause an electric shock or personal injury on the jagged broken edge. Remove the battery or power cord and ask your nearest Nikon representatives to repair it.

5. Do not allow this product to become wet.

Do not allow this product to become wet. It may cause malfunction, overheating, or electric shock. If this product becomes wet, immediately turn off the power and remove the battery or power cord. Then dry it well with a soft dry cloth.

6. Do not allow any foreign material to enter this product.

Do not allow foreign material to enter the inside of this product. It may cause malfunction. If any foreign material enters inside, stop using this product and contact your nearest Nikon representatives.

7. Never use this product in a flammable or combustible environment.

Using it in a combustible gas or dust environment may cause an explosion or fire.

8. Do not put anything on or over the P-400Rv/P-400R.

Do not put anything on or over the P-400Rv/P-400R Digital Microscope (camera head). Doing so may reduce cooling and cause heat to collect inside this product, resulting in malfunction or fire.

9. Do not block the ventilation holes of the motorized stand and the touch panel monitor.

Do not block the ventilation holes on the back of the P-MFSC Motorized Focusing Stand Controller and the P-TPM Touch Panel Monitor. Doing so may cause heat inside this product, resulting in malfunction or fire.

10. Check the input voltage.

The P-MFSC Motorized Focusing Stand Controller, the P-TPM Touch Panel Monitor, the P-CH01 P-BACH Battery Charger, and the AC Adapter for the P-400Rv/P-400R Digital Microscope operate on 100 to 240 VAC, 50/60 Hz power supply. Before connecting the power supply, confirm that the voltage and frequency of the power supply line to be used are within the above range. Using a power supply line that does not satisfy the rating may cause failure or malfunction of the equipment or fire.

**WARNING (for the overall product)****11. Power to individual units must be supplied from AC outlets which are as close together as possible.**

When connecting the P-MFSC Motorized Focusing Stand Controller and the P-TPM Touch Panel Monitor to the power supply, plug the individual power cords into AC outlets that are as close together as possible. If plugging the units in AC outlets apart from each other, differences in voltage may cause a potential difference, resulting in malfunction.

Similarly, when connecting the P-MFSC Motorized Focusing Stand Controller to the personal computer, plug the computer's power cord into an AC outlet that is as close as possible to the related outlets.

12. Use the specified power cords.

Connect the specified power cords to the P-MFSC Motorized Focusing Stand Controller, the P-TPM Touch Panel Monitor, the P-CH01 P-BACH Battery Charger, and the AC Adapter for the P-400Rv/P-400R Digital Microscope. If any other power cords are used, it may cause malfunction or overheating of this product or fire.

- See "14 Major Specifications" for details about the specified power cords.
- To protect from electric shock, always turn off the power switch before disconnecting and connecting power cords.
- This product belongs to the electric shock protection class I. Be sure to connect it to the protective earth terminal.

13. Use the specified AC adapter.

When using a stand-alone P-400Rv/P-400R Digital Microscope after removing it from the stand, the AC adapter can be used as the power supply source. Be sure to connect the specified AC adapter to the microscope's main unit. If any other AC adapter is connected, it may cause malfunction or overheating of this product or fire.

- See "14 Major Specifications" for details about the specified AC adapter.
- Place the AC adapter in a well-ventilated location. Do not place anything such as paper on the AC adapter. It will reduce cooling and cause overheating.
- Before connecting the AC adapter, be sure to turn off the power supply of the P-400Rv/P-400R Digital Microscope without fail to prevent failure or malfunction.

14. Be sure to unplug the power cord from the AC outlet before connecting devices.

When connecting the P-TPM Touch Panel Monitor or an external display to the P-MFSC Motorized Focusing Stand Controller using a DVI cable or a RGB cable, or when connecting a device such as a PC to the P-MFSC using a USB cable, be sure to unplug the power cord from the AC outlet.

In addition, after connecting the P-TPM or an external display to the P-MFSC using a DVI cable or a RGB cable, plug the power cord in to a grounded AC outlet.

Connecting devices in the wrong order may cause a malfunction.

**WARNING (for the overall product)****15. Precautions for illumination**

A ring illumination that uses white LEDs is installed around the lens of the P-400Rv/P-400R. To prevent damage to eyesight, be sure to observe the following precautions.

- Do not point the luminous section toward a person.
- Do not look into or look directly the luminous section.
- When a specimen is observed with a high reflection rate, illumination may be scattered around the specimen. Wear protective glasses or goggles if necessary.

16. Precautions for vertical movement of the motorized stand

The elevating section (arm) of the P-MFSC Motorized Focusing Stand Controller can be moved vertically by operations on the operation panel or the touch panel. When moving the arm vertically, observe the following precautions to prevent possible injury.

- Before starting operation, check the status of the entire system and confirm that the vertically moving the arm will cause no problem.
- Keep your hand off the arm, the P-400Rv/P-400R Digital Microscope, the stage, and a specimen or vessel on the stage during operation to prevent possible injury to your hands or fingers. Otherwise, your hands or fingers may be pinched between those units or components, which may result in injury.

17. Precautions for handling flammable solvent

This product uses the following flammable solvents.

- Absolute alcohol (ethyl or methyl alcohol used for cleaning optical elements)

Never put these solvents close to fire. Before using the solvent, read carefully the precautions specified by the manufacturer of the solvent to use it safely. When using the solvent on this product, observe the following precautions.

- Never put the solvent close to this product when turning on/off the power switch or plugging in/out the power cord.
- Handle the solvent with care not to spill it.

**CAUTION (for the overall product)****1. Handle this product with care.**

This product is a precision optical device. Handle it with care so that no sudden shocks are applied to it.

2. Precautions for handling optical components

If there is a scratch or dirt such as a fingerprint on the lens or other optical components, image quality will be degraded. Handle the optical components carefully so as not to scratch them. If dirt has adhered to any optical component, clean it off in accordance with the procedure in “13 Daily Maintenance.”

3. Precautions against electromagnetic interference

This product generates weak electromagnetic waves. In addition, this product is made for industrial use. Do not use this product close to electronic devices or wireless equipment. Doing so may cause electromagnetic interference resulting in performance degradation or malfunction of the equipment. In this case, you may need to take measures such as putting placing such devices and equipment farther from this product.

4. Turn off the power before starting installation, assembly, or connecting/disconnecting cables, as well as before starting maintenance work.

To prevent the occurrence of possible accidents such as electric shock and fire, turn off the power to the system and unplug the power cord from the AC outlet before starting installation, assembly, or connecting/disconnecting cables, as well as before starting maintenance work.

5. Precautions for carrying the equipment

- When carrying the P-MFSC Motorized Focusing Stand Controller, put one hand in the hollow on the back of the pillar and the other under the bottom front and hold the stand firmly.
- If you hold the P-400Rv/P-400R Digital Microscope, the arm (elevating section), and the stage for carrying the equipment, they may be disengaged. This may cause malfunction or decrease the accuracy. Never hold such components for carrying.

6. Precautions during assembly

- Be careful not to pinch your finger or hand between components when mounting them.
- If there is a scratch or dirt such as a fingerprint on the lens, image quality will be degraded. Be careful not to scratch or directly touch the lens while assembling.

7. Precautions for elevating section

Do not move the arm (elevating section) of the P-MFSC Motorized Focusing Stand Controller forcibly by hand. Doing so may cause failure.

8. Precautions for the touch panel

- Do not strike or push the touch panel screen too hard. The surface glass of the touch panel may break and cause injury.
- Use the supplied stylus to touch the touch panel. Never use a hard or sharp-pointed object, such as a ballpoint pen, to touch the panel screen. Doing so will cause scratches on the surface of the screen, which may result in malfunction. If there is no stylus, touch the panel gently with your fingertip. Be careful not to let your finger nail scratch the screen.
- Do not expose the touch panel to direct sunlight or strong ultraviolet radiation. Doing so may cause the display characteristics to degrade.

**CAUTION (for the overall product)****9. Precautions for use of the strap**

When attaching the strap to the P-400Rv/P-400R Digital Microscope, observe the following precautions.

- The P-400Rv/P-400R weighs approximately 1.1 kg including the battery. Use a strap strong enough to support the weight. Never use straps designed for mobile phones.
- When carrying the P-400Rv/P-400R with the strap attached, be careful not to let the strap get caught on something. Otherwise, it may cause unexpected injury or damage to this product.

10. Precautions for installation/usage environment and storage environment

This product is a precision optical device. Using or storing it under improper environment may result in a failure or degraded precision. When using or storing this product, observe the following conditions.

- **Installation/Usage environment**
Use this product in a location where the temperature is from 0 to +40°C and a relative humidity is 60% or less (no condensation).
- **Storage environment**
Choose a location where the temperature is from -20 to +60°C and a relative humidity is 90% or less (no condensation).
- When installing or storing this product in a hot and humid place, condensation or mold may appear on the lens, resulting in a performance degradation or malfunction.
- Install this product so that there is at least 10 cm of clearance around this product.
- Install this product in a location that is free of dirt and dust.
- Install this product horizontally in a vibration-free area.
- Install this product on a firm and secure pedestal or desk.
- Place this product in a place which allows easy removal of power cord from the inlet of the AC adapter in the event of an emergency.
- Do not place and use this product in a closed space such as a locker or a cabinet.
- Do not place anything on this product.
- During storage, place a cover over this product to avoid dust.
- See “14 Major Specifications” for details about the usage and storage environments for this product.

11. Precautions for disposal

When discarding this product, dispose of it in accordance with the regulations or rules of the municipality. Do not dispose of this product as household waste.

**DANGER (for the battery)**

- 1. Never throw the battery into fire or subject it to heat.**
Doing so may cause the battery to leak, explode, or overheat. This could result in burning, personal injury, or fire.
- 2. Do not disassemble or modify the battery.**
Doing so may cause the battery to leak, explode, or overheat. This could result in burning, personal injury, or fire.
- 3. Do not short the battery's terminals.**
Doing so may cause the battery to leak, explode, or overheat. This could result in burning, personal injury, or fire.
- 4. Never transport or store the removed battery together with a metal object.**
Doing so may cause the battery to leak, explode, or overheat due to a short circuit. This could result in burning, personal injury, or fire.
- 5. Use only the dedicated battery charger to charge the battery.**
Doing so may cause the battery to leak, explode, or overheat. This could result in burning, personal injury, or fire.
- 6. Do not use the battery for any other equipment than the P-400Rv/P-400R Digital Microscope.**
Doing so may cause the battery to leak, explode, or overheat. This could result in burning, personal injury, or fire.
- 7. If battery fluid gets into your eyes, never rub your eyes and immediately flush them with clean running water. Then consult the physician promptly.**
If this precaution is ignored, there is a risk of loss of vision or damage to eyesight.

**WARNING (for the battery)**

- 1. Do not throw the battery or subject the battery to strong impact.**

Doing so may cause the battery to leak, explode, or overheat. This could result in burning, personal injury, or fire.
- 2. Do not allow the battery to become wet.**

Doing so may cause the battery to leak, explode, or overheat. This could result in burning, personal injury, or fire.
- 3. Do not handle the battery when your hands are wet.**

Doing so may cause the battery to leak, explode, or overheat. This could result in burning, personal injury, or fire.
- 4. Keep the battery out of the reach of small children.**

The battery can be mistakenly swallowed by young children. If you suspect this has happened, consult your physician immediately.
- 5. If charging has not finished within the specified charging time, stop charging.**

Continuing with charging may cause the battery to leak, explode, or overheat. This could result in burning, personal injury, or fire.
- 6. If you notice any abnormality with the battery, such as discoloration, deformation, and unusual odor, stop using it.**

Continuing to use the battery may cause it to leak, explode, or overheat. This could result in burning, personal injury, or fire.

If you notice any abnormality with the battery, contact your nearest Nikon representative.
- 7. When recycling or discarding the battery, insulate the battery's contacts with tape, etc.**

This is to prevent them from coming into contact with other metallic objects, which may result in battery leakage, explosion, or overheating.
- 8. If battery fluid gets on your skin and clothing, immediately rinse the affected area with clean water.**

Otherwise, it will cause skin injury.

**CAUTION (for the battery)**

- 1. If this product is not used for a long time, remove the battery.**

Otherwise, the battery may leak, explode, or overheat, which may cause malfunction of this product, personal injury, burning, or fire.
- 2. When storing the battery, observe the following precautions.**
 - Store the battery in the environment specified in “14 Major Specifications.”
 - Never leave the battery in a location where it will be subject to high temperatures, such as a location exposed to direct sunlight, a location exposed directly to a heater or stove, or a closed vehicle during summer months.
 - Be careful not to short the contacts.
 - Store the battery in a location that is free of dirt and dust.

**WARNING (for the battery charger)**

- 1. Never disassemble, repair, or modify the battery charger.**
Doing so may cause an electric shock or personal injury.
- 2. If the inside of the battery charger is exposed due to breakage, never touch the exposed area.**
Doing so may cause an electric shock or personal injury on the jagged broken edge. Disconnect the power cord from the AC outlet and ask your nearest Nikon representatives to repair it.
- 3. If you notice any abnormality such as overheating, smoke, or burnt odor, immediately pull out the power cord from the AC outlet.**
Otherwise, the battery charger may ignite, leading to fire. Be careful not to burn yourself when pulling out the battery charger's power cord from the AC outlet. Ask your nearest Nikon representatives to repair it.
- 4. Do not allow the battery charger to become wet.**
Doing so may cause electrical shock or fire.
- 5. Do not handle the battery charger when your hands are wet.**
Doing so may cause malfunction or electrical shock.
- 6. Never use the battery charger in a flammable or combustible environment.**
Using it in a combustible gas or dust environment may cause an explosion or fire.
- 7. Clean off any dust on and around the metallic part of the power plug with a dry cloth.**
Otherwise, continued use may cause fire.
- 8. Check the input voltage.**
The battery charger operates on 100 to 240 VAC, 50/60 Hz power supply. Before connecting the power supply, confirm that the voltage and frequency of the power supply line to use are within the above range. Using a power supply line that does not satisfy the rating may cause failure or malfunction of the equipment or fire.
- 9. Use the power cord supplied with the battery charger.**
Use the supplied power cord without fail. If any other power cord is used, it may cause malfunction or overheating of the equipment or fire. Do not use the power cord supplied with the battery charger for any other devices.

**CAUTION (for the battery charger)**

- 1. Never put a cloth over the battery charger during use.**
Heat accumulated under the cloth may deform the case or cause fire.
- 2. Unplug the power cord when the battery charger is not used.**
Otherwise, electric shock may occur.



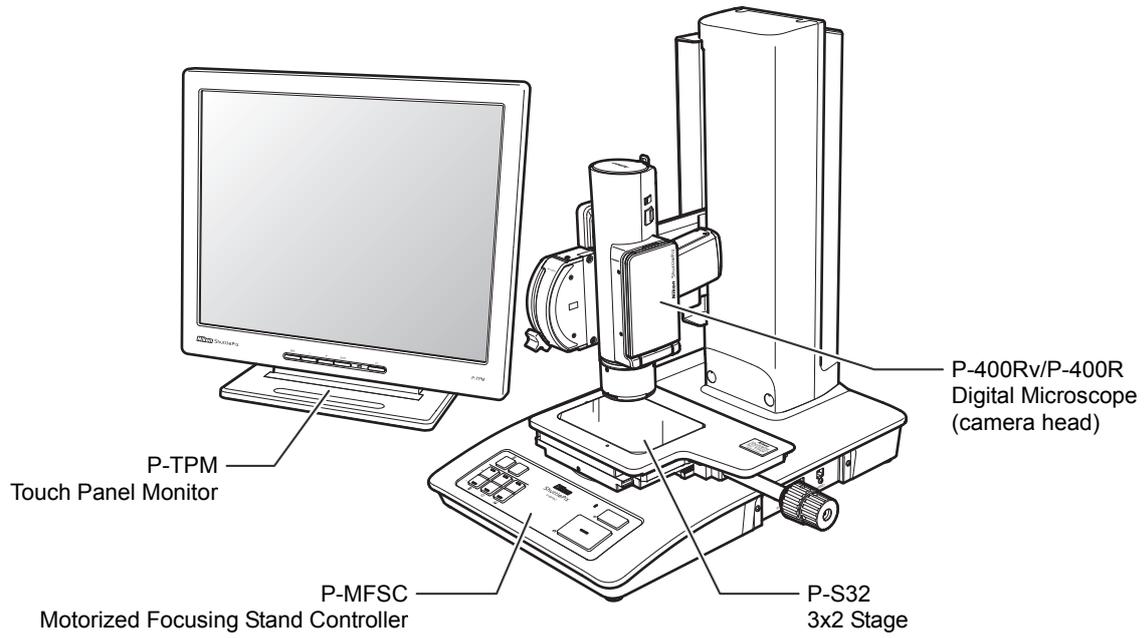
Names of Components

This chapter explains the names of major components and the structure of this system.

Before using this system for the first time, read this chapter to check the names of individual components and their positions. Return to this chapter whenever you need to check the names and positions of components.

1.1 Basic Configuration of the System

The standard configuration of this system is shown below.

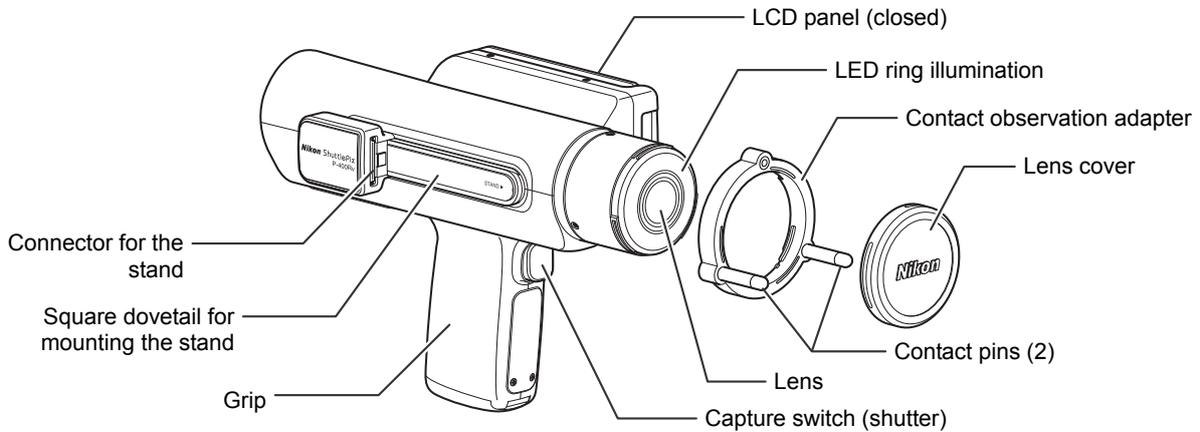


1

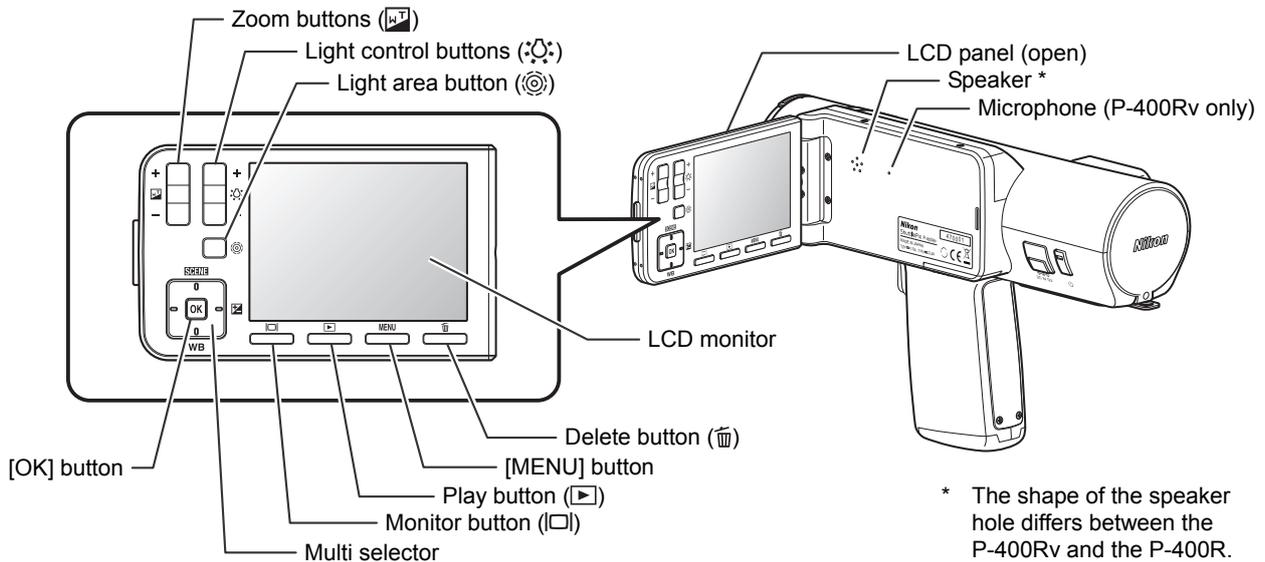
Names of Components

1.2 P-400Rv/P-400R Digital Microscope (Camera Head)

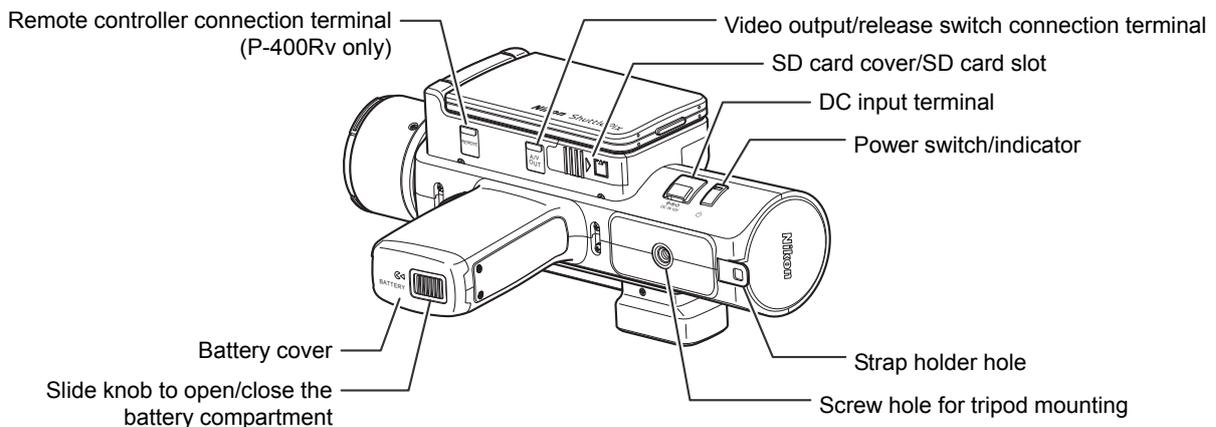
Front/left side view



LCD panel



Right side/bottom/rear view

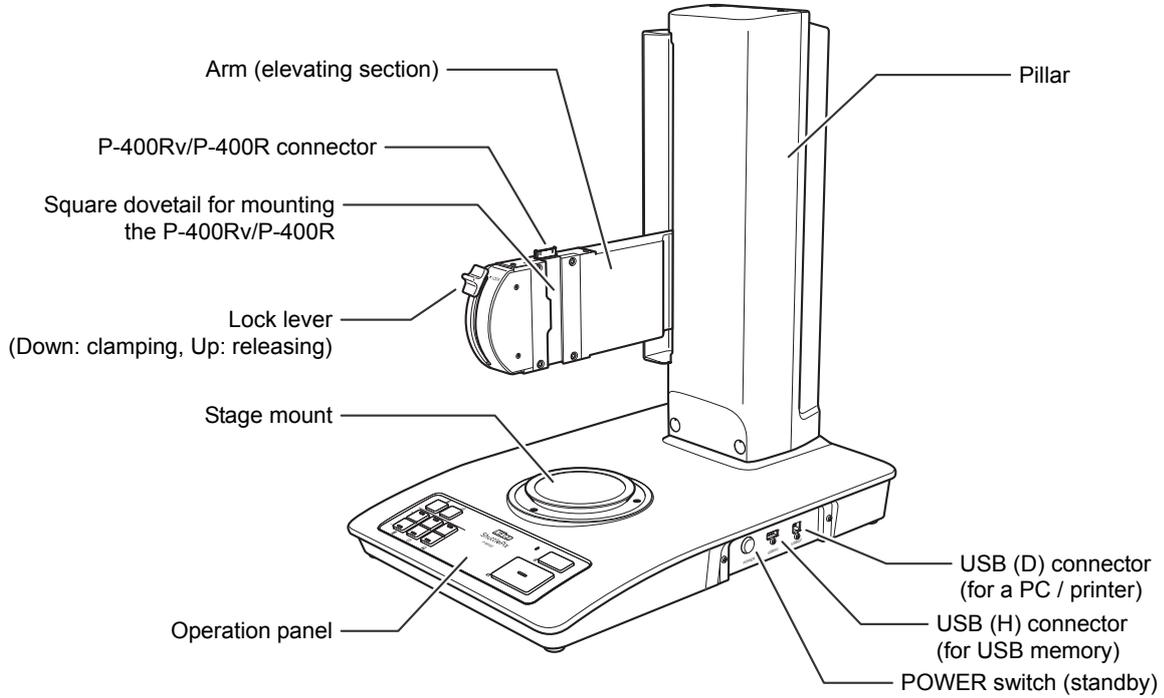


✔ Operation of the P-400Rv/P-400R

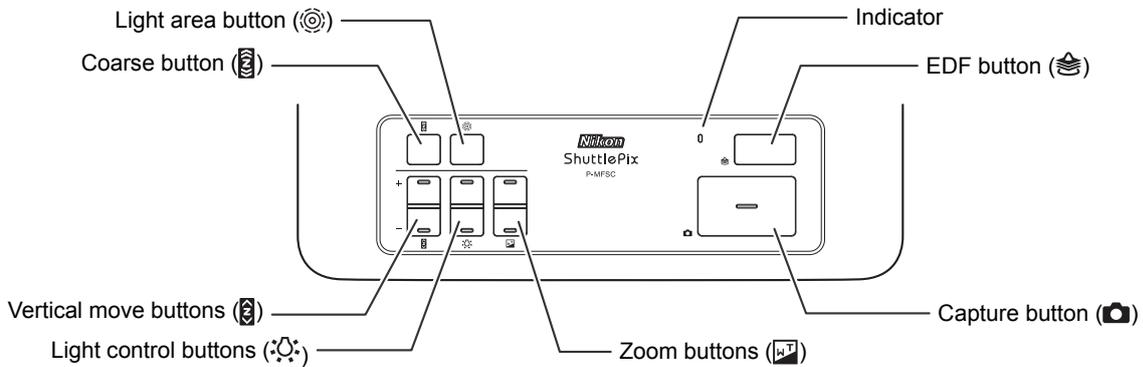
See the “P-400Rv Digital Microscope Instructions” or “P-400R Digital Microscope Instructions” for details on how to use the P-400Rv/P-400R alone.

1.3 P-MFSC Motorized Focusing Stand Controller

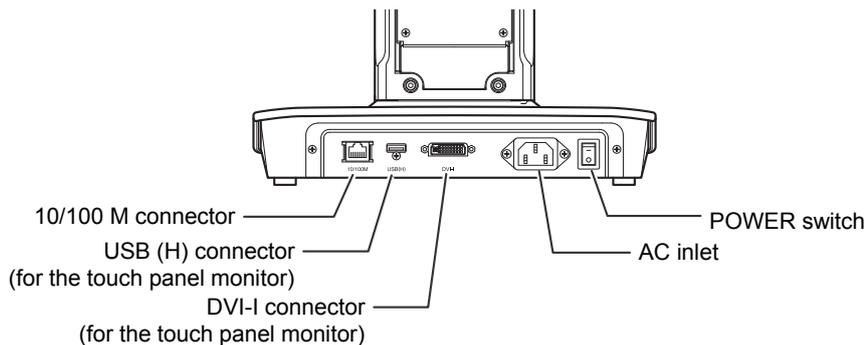
Front/right side view



Operation panel

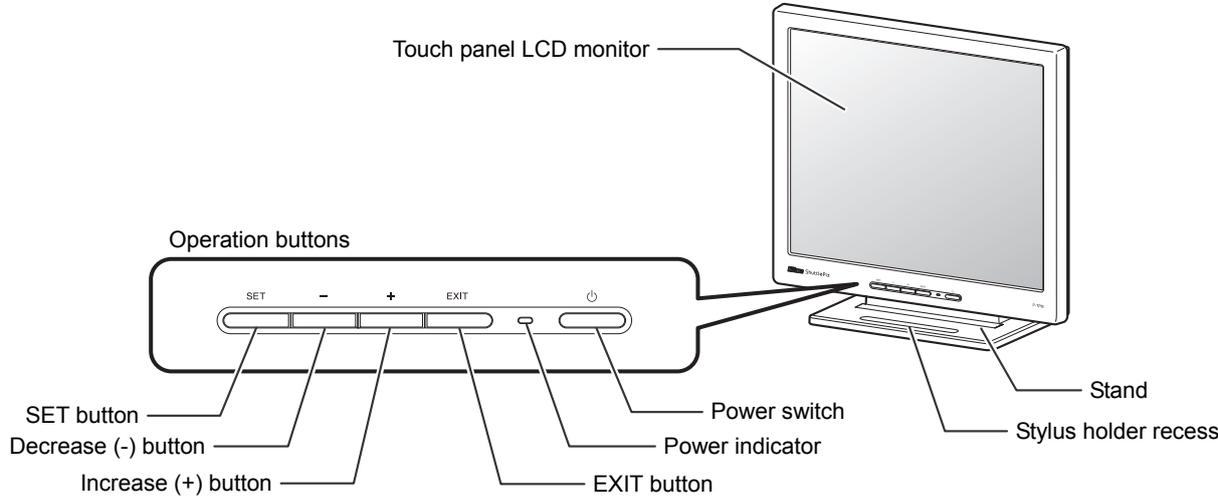


Rear view

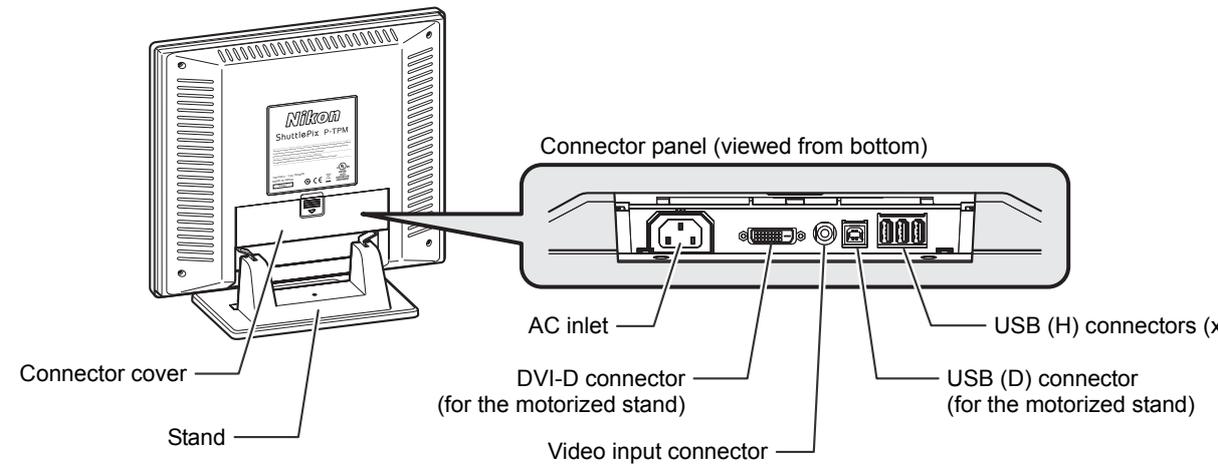


1.4 P-TPM Touch Panel Monitor

Front view



Rear view



1.5 Touch Panel Monitor Display Screen

Composition of the screen



* The setup menu is not displayed when other menu is displayed.

(1) Live image or playback image

An image being viewed on the camera head (live image) or already captured image (playback image) is displayed. The screen can be split in order to view both images. The type of the image being displayed is shown on the status bar; CAM for a live image, FREEZE for a still image, VIEW for a playback image, EDF for an EDF image or HDR for an HDR image.

(2) Status bar

The status bar is always shown at the bottom of the screen. On the left side of the bar, the current date and buttons for accessing menus are shown. On the right side of the bar, status of the system is shown; zoomed, illumination, location of z-axis, display size, exposure information, etc. In the center of the bar, type of image being displayed, zoom magnification, and message related to the exposure status are shown.

(3) Operation menu

This is the main menu for operating the system. It appears when the [MENU] button is pressed. There are four menus: [EASY MENU], [MAIN MENU], [VIEW MENU] and [TOOL MENU].

(4) Toolbar

The toolbar contains buttons for simplified measurement. It appears when the [TOOLBAR] button on the status bar is pressed. The location of the toolbar moves up and down each time the [TOOLBAR] button is pressed.

(5) Histogram

The histogram view displays a histogram of a live image, that is, a graph that shows the spectrum of brightness of the image. It appears when the [HISTOGRAM] button on the status bar is pressed. The location of the histogram view moves up and down each time the [HISTOGRAM] button is pressed.

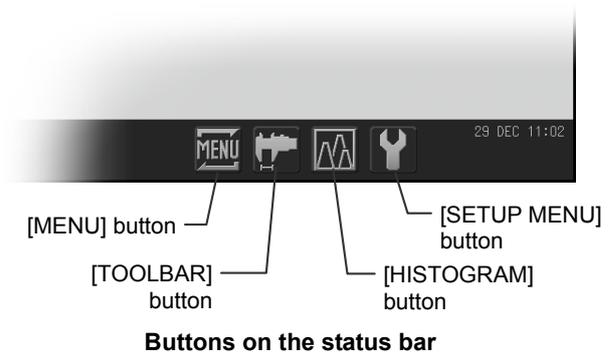
(6) Setup menu

This is the menu for initial setup of the system. It appears when the [SETUP MENU] button on the status bar is pressed. There are four screens: [SETUP MENU: MAIN], [SETUP MENU: NETWORK], [SETUP MENU: FILE] and [SETUP MENU: ADDITIONAL].

Buttons on the status bar

Pressing a button on the status bar displays a menu screen on the screen. There are the following buttons:

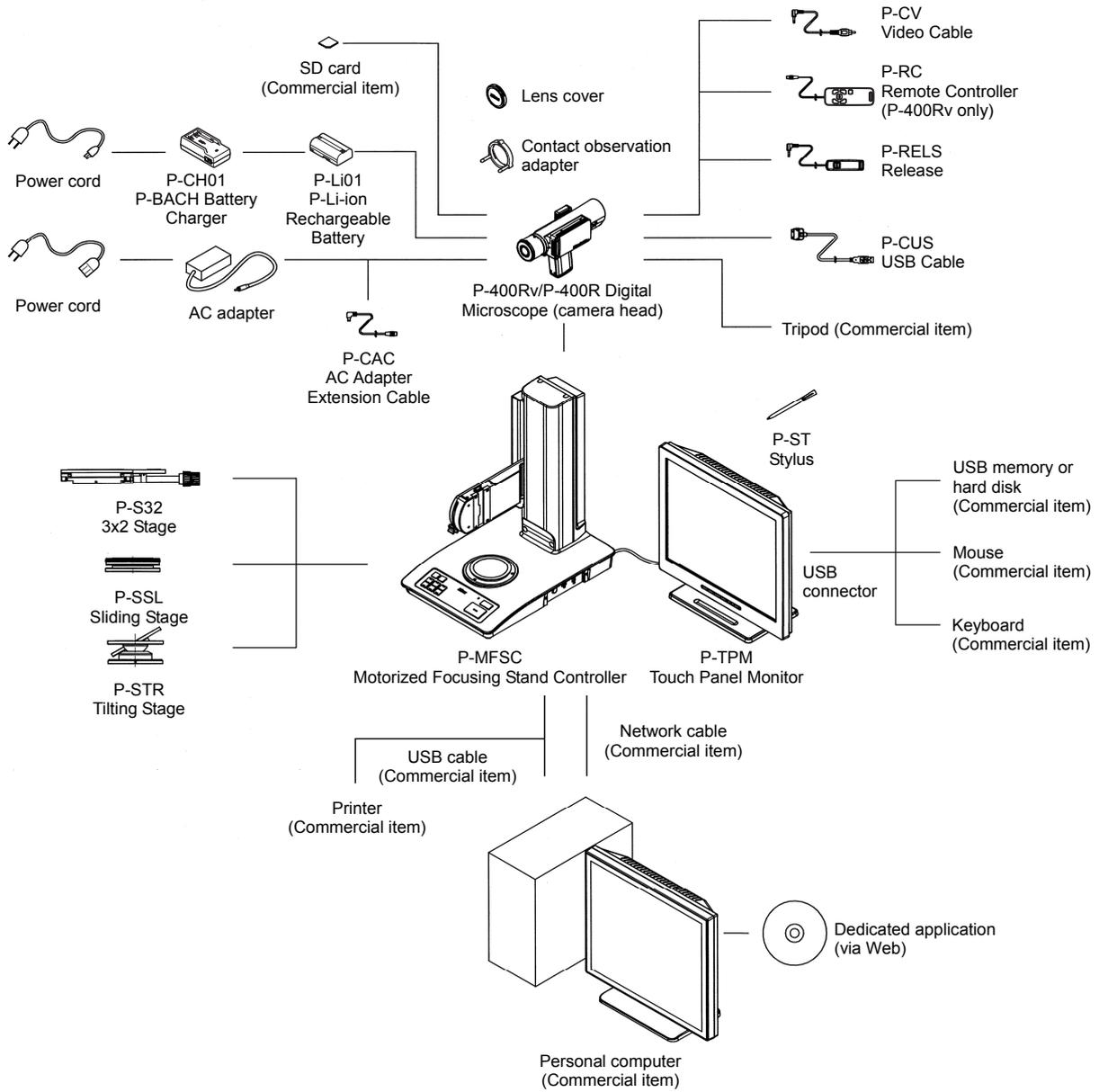
- **[MENU] button**
The operation menu appears on the top left (or top right) of the screen. The location of the menu changes to the left or right each time the button is pressed.
- **[TOOLBAR] button**
The toolbar appears on the top right of the screen. The location of the menu changes up and down each time the button is pressed.
- **[HISTOGRAM] button**
The histogram view appears on the bottom right of the screen. The location of the view changes up and down each time the button is pressed.
- **[SETUP MENU] button**
The Setup menu appears. Other menus disappear when the setup menu appears.



1.6 System Configuration Structure

1

Names of Components



2

Preparing for Use

This chapter describes the procedures for assembling this system and preparations necessary for observing or capturing images.

2.1 Assembling the System

This section describes how to assemble and connect the ShuttlePix Digital Microscope.

⚠ CAUTION - Before starting assembly and connection
 Before starting assembly and connection of the system, be sure to read “Safety Precautions” described in the beginning of this manual and observe the precautions without fail.

Necessary tools

The following tool is required for the work described in this section.

- Allen wrench
 (width across flats 2 mm, supplied with the P-MFSC Motorized Focusing Stand Controller)

2.1.1 Preparing the Motorized Stand

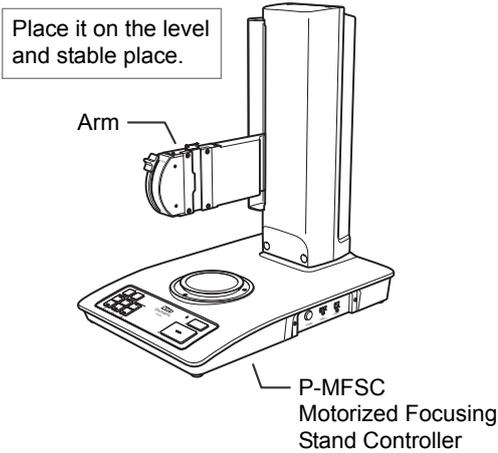
Prepare for the P-MFSC Motorized Focusing Stand Controller to be used.

(1) Assembling the motorized stand

Place the P-MFSC Motorized Focusing Stand Controller on a level and stable surface of a desk, etc.

⚠ CAUTION – Do not hold the arm when placing it.

- Do not grab the arm of the elevating section to lift the motorized stand nor apply force to the arm. Doing so may influence the accuracy.
- When lifting the motorized stand, put one hand in the hollow on the back of the pillar and the other under the bottom front and hold it firmly.



(2) Mounting the stage on the motorized stand

The following three types of stages can be set on the stage mount on the motorized stand.

- P-S32 3x2 Stage
- P-SSL Sliding Stage
- P-STR Tilting Stage

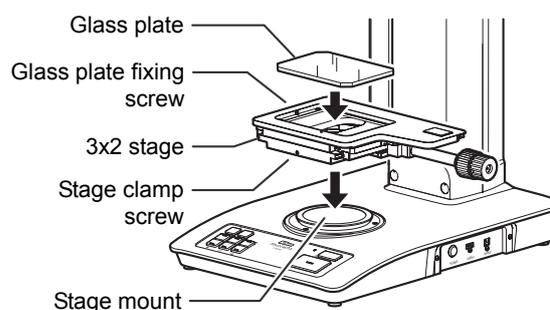
P-S32 3x2 Stage

- 1 Loosen the stage clamp screw of the 3x2 stage with the Allen wrench supplied with the motorized stand.**

Do not remove the clamp screw.

- 2 Mount the stage by aligning it with the round dovetail of the stage mount on the motorized stand. Tighten the stage clamp screw to fix the stage.**

- 3 Place the glass plate in the depression on the upper surface of the 3x2 stage. Lightly tighten the glass plate fixing screw using the Allen wrench and fix the glass plate.**



⚠ Handling the stage plate

Do not move the stage plate by hand. Doing so may cause malfunction.
To move the stage, use the stage moving knob without fail.

■ Specifications for the P-S32 3x2 Stage

Model name	P-S32 3x2 Stage
External dimensions (width x depth x height)	228 x 139 x 31 mm (excluding the knob) Height to the upper surface of the glass plate: 31.5 mm
Length of the knob	228.5 mm (from the center)
Stage glass plate	122 (W) x 88 (D) x 5 (T) mm Fix it with the M4 hexagon socket head screw.
Travel distance	X: 76 mm, Y: 51 mm
Load weight capacity	47.1 N (4.8 kgf) and below
Mounting	Round dovetail (93 mm nominal diameter, female) Fix it with the M4 hexagon socket head screw.

P-SSL Sliding Stage

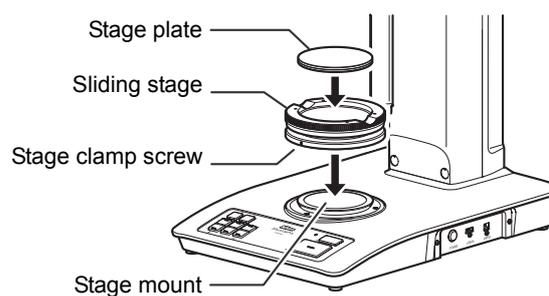
- 1 Loosen the stage clamp screw of the sliding stage using the Allen wrench supplied with the motorized stand.**

Do not remove the clamp screw.

- 2 Mount the stage by aligning it with the round dovetail of the stage mount on the motorized stand. Tighten the stage clamp screw to fix the stage.**

- 3 Place the stage plate in the depression on the upper surface of the stage.**

The upper and lower surfaces of the stage plate are colored black and white, respectively. Use either side depending on the specimen to be observed.



✔ Screw holes on the top of the stage

On the top of the sliding stage, four screw holes are provided for attaching the clips which are sold separately.

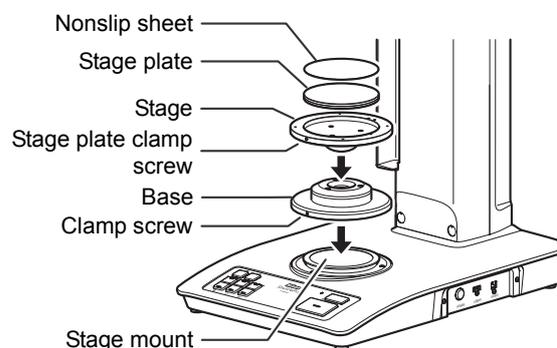
■ Specifications for the P-SSL Sliding Stage

Model name	P-SSL Sliding Stage
External dimensions (diameter x height)	120 x 31.5 mm
Stage plate (diameter x thickness)	90 x 6 mm
Sliding stroke	20 mm (diameter)
Clip mounting hole	3 mm (diameter) x 10 mm (depth), 4 holes
Mounting	Round dovetail (93 mm nominal diameter, female) Fix it with the M4 hexagon socket head screw.
Accessory	Stage plate

P-STR Tilting Stage

The tilting stage is separated into two parts: the base and the stage. First fix the base to the motorized stand and then mount the stage on it.

- 1** Loosen the clamp screw of the base using the Allen wrench supplied with the motorized stand.
- 2** Mount the base by aligning it with the round dovetail of the stage mount on the motorized stand. Tighten the clamp screw to fix the base.
- 3** Mount the stage on the base.
- 4** Place the stage plate in the depression on the upper surface of the stage. Tighten the clamp screw using the Allen wrench and fix the stage plate.



The upper and lower surfaces of the stage plate are colored black and white, respectively. Use either side depending on the specimen to be observed.

- 5** Attach the nonslip sheet to the stage plate if necessary.

The nonslip sheet prevents the specimen from sliding when the stage is tilted. Peel off the protection films from both sides of the sheet and attach the sheet to the white surface of the stage plate.

⚠ Stage of the P-STR Tilting Stage

The stage could fall off when the motorized stand is tilted because the stage is not fixed to the base. Do not move the motorized stand with the stage left on the base.

✔ Screw holes on the top of the stage

On the top of the tilting stage, two screw holes are provided for attaching the clips which are sold separately and four universal screw holes (M3) for multiple purposes.

✔ Nonslip sheet

- The nonslip sheet can be peeled off and reused multiple times.
- When the adhesion force of the nonslip sheet decreases, rinse the adhesive surface with water or clean it using neutral detergent. This will restore the adhesion force.

■ Specifications for the P-STR Tilting Stage

Model name	P-STR Tilting Stage
External dimensions (diameter x height)	120 x 52.5 mm
Stage plate (diameter x thickness)	90 x 6 mm
Tilting range	30° from horizontal to all directions
Clip mounting hole	3 mm (diameter) x 10 mm (depth), 2 holes
Mounting	Round dovetail (93 mm nominal diameter, female) Fix it with the M4 hexagon socket head screw.
Accessories	Stage plate, nonslip sheet

(3) Connecting the power supply to the motorized stand

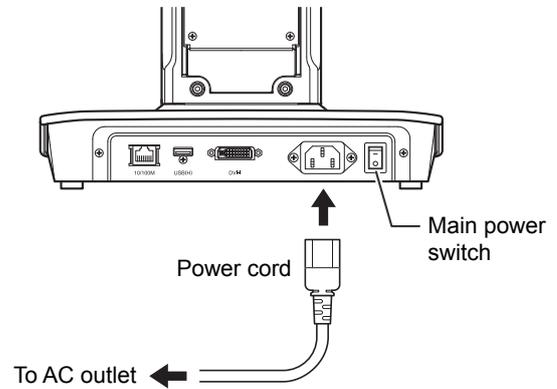
⚠ CAUTION – Power cord

Be sure to use the power cord specified in this manual. If any other power cords are used, it may cause malfunction or fire. See “14 Major Specifications” for details about the specified power cords.

2

Preparing for Use

- 1** Check that the main power switch is turned off (pressed to the “O” side) on the rear side of the motorized stand.
- 2** Plug the power cord into the AC inlet on the rear side of the motorized stand.
- 3** Plug the other side of the power cord into the AC outlet.



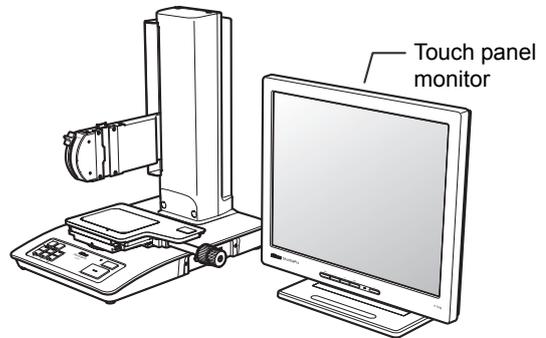
2.1.2 Preparing the Touch Panel Monitor

Prepare for using the P-TPM Touch Panel Monitor.

(1) Placing the touch panel monitor

Place the touch panel monitor in an easy-to-operate location. Be careful not to damage the touch panel while placing the monitor.

The angle of the monitor can be adjusted upward up to 15°. Adjust it to a suitable angle.



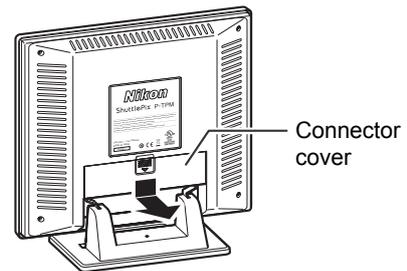
(2) Connecting the touch panel monitor to the motorized stand

Connect the touch panel monitor to the motorized stand using the DVI cable and the USB cable supplied with the touch panel monitor.

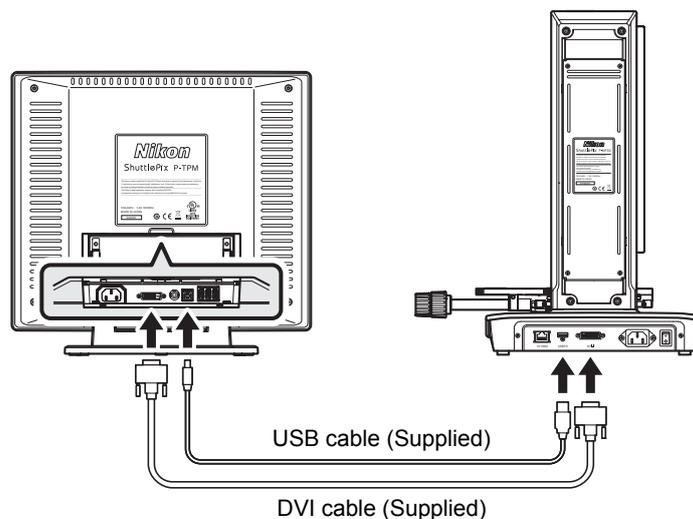
1 Remove the connector cover from the rear side of the touch panel monitor.

The connector cover can be removed by sliding it down.

Upon completion of cable connection, mount the connector cover in its original position.



2 Connect the touch panel monitor and the motorized stand using the DVI cable and the USB cable supplied with this product.

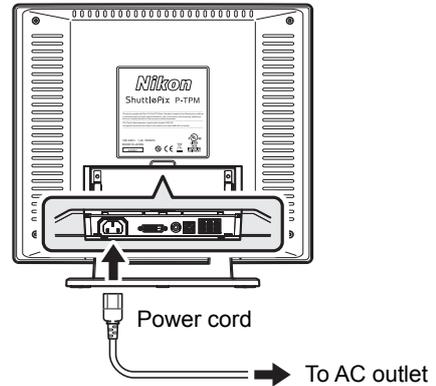


(3) Connecting the touch panel monitor to the power supply

⚠ CAUTION – Power cord

Be sure to use the power cord specified in this manual. If any other power cords are used, it may cause malfunction or fire. See the “P-TPM Touch Panel Monitor Instructions” for details about the specified power cords.

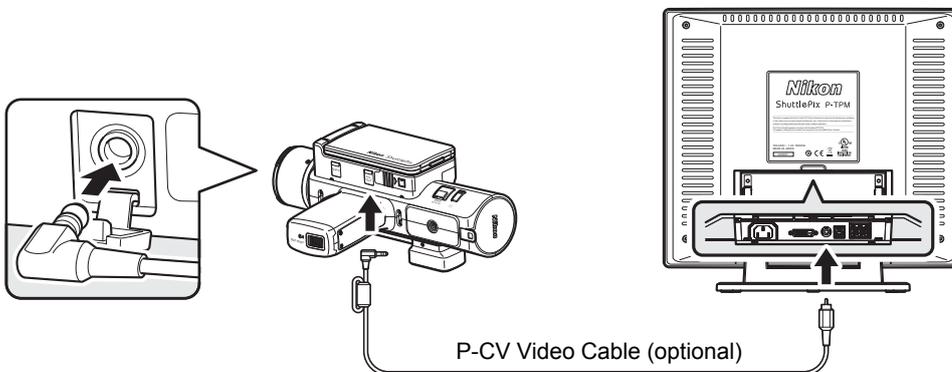
- 1 Insert the power cord plug into the AC inlet on the rear side of the stand.
- 2 Connect the other side of the power cord plug to the AC outlet.



(4) Connecting the touch panel monitor to the P-400Rv/P-400R (optional)

The touch panel monitor has a video input terminal.

If the touch panel monitor is connected to the P-400Rv/P-400R Digital Microscope using the separately-sold optional P-CV Video Cable, a live image or reproduced image of the P-400Rv/P-400R can be observed on the touch panel monitor.



✔ Switching the input of the touch panel monitor

Switching between the inputs of the touch panel monitor is performed automatically depending on whether signal exists or not. To switch input between the device on the DVI cable side and the device on the video cable side, remove the cable of the device not to be displayed or turn off the power to the device.

2.1.3

Mounting the P-400Rv/P-400R on the Motorized Stand

Mount the P-400Rv/P-400R Digital Microscope on the P-MFSC Motorized Focusing Stand Controller.

Being mounted on the motorized stand, the P-400Rv/P-400R serves as the camera head of the digital microscope system. Operations can be controlled only from the motorized stand and the touch panel monitor, but not from the LCD panel or the switches of the P-400Rv/P-400R.

⚠ CAUTION – Mounting the P-400Rv/P-400R

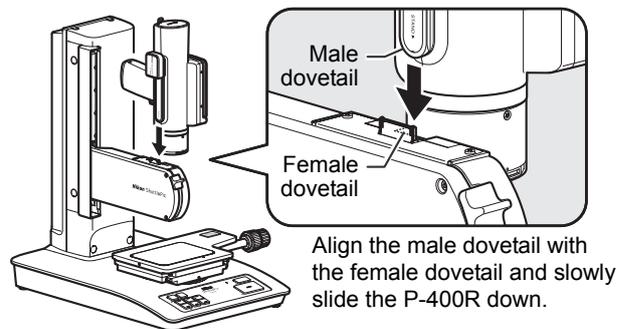
- Be careful not to drop the P-400Rv/P-400R while performing the mounting procedure.
- Do not put an object other than the P-400Rv/P-400R on the arm of the motorized stand.
- Avoid applying excessive force to the arm. This may cause malfunction or decrease the accuracy. Hold the arm by hand while mounting or dismounting the P-400Rv/P-400R.
- When using the P-400Rv/P-400R mounted on the motorized stand, do not connect the AC adapter (optional) to the P-400Rv/P-400R. If the system is turned on with the AC adapter connected, the P-400Rv/P-400R is not recognized correctly and a warning message appears.

2

Preparing for Use

(1) Mounting the P-400Rv/P-400R

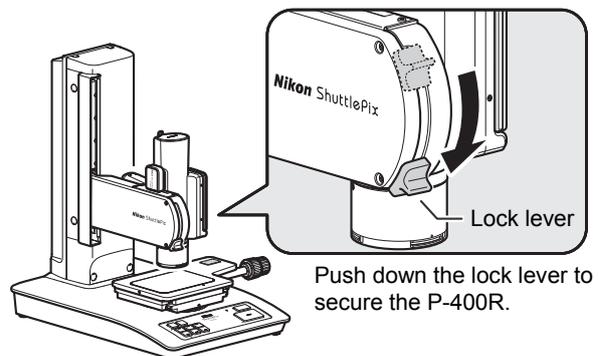
- 1 Check that the power to the P-400Rv/P-400R and the motorized stand is turned off.**
- 2 Check that the lock lever of the arm of the motorized stand is in the upper position.**
- 3 Align the male dovetail on the side of the P-400Rv/P-400R with the female dovetail of the arm. Hold the arm by hand and slide the P-400Rv/P-400R slowly down to mount it on the arm.**



Push down the P-400Rv/P-400R to the limit position. Be sure to hold the arm by hand to protect it from excessive force being applied.

- 4 Push down the lock lever of the arm.**

The P-400Rv/P-400R is locked in the position.

**⚠ Do not use the contact observation adapter.**

Before using the P-400Rv/P-400R mounted on the motorized stand, be sure to remove the contact observation adapter. If the arm with the contact observation adapter attached is moved, the contact observation adapter may collide with the specimen or stage and break. This may cause damage to the adapter or malfunction of the arm.

⚠ P-400R firmware

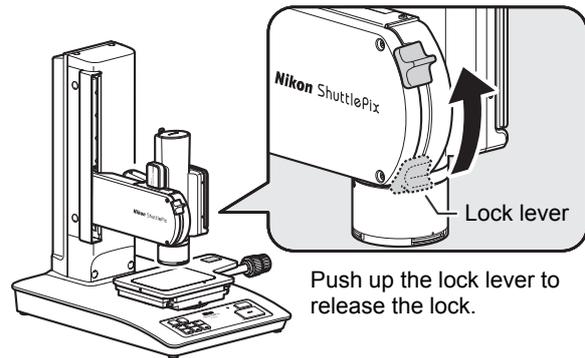
If a P-400R with an old version firmware attached to the motorized stand is used, a message may appear at power-on, making no operation possible. In such a case, turn off the power using the POWER switch of the motorized stand, remove the P-400R from the stand, and then upgrade the firmware.

(2) Removing the P-400Rv/P-400R

1 Check that the power is turned off at the motorized stand.

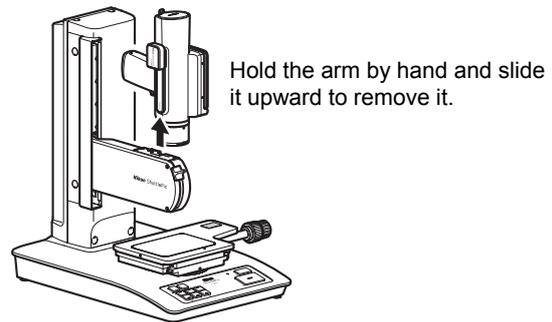
2 Push up the lock lever of the arm.

The P-400Rv/P-400R is unlocked.



3 Hold the arm by hand and slide the P-400Rv/P-400R upward to remove it from the arm.

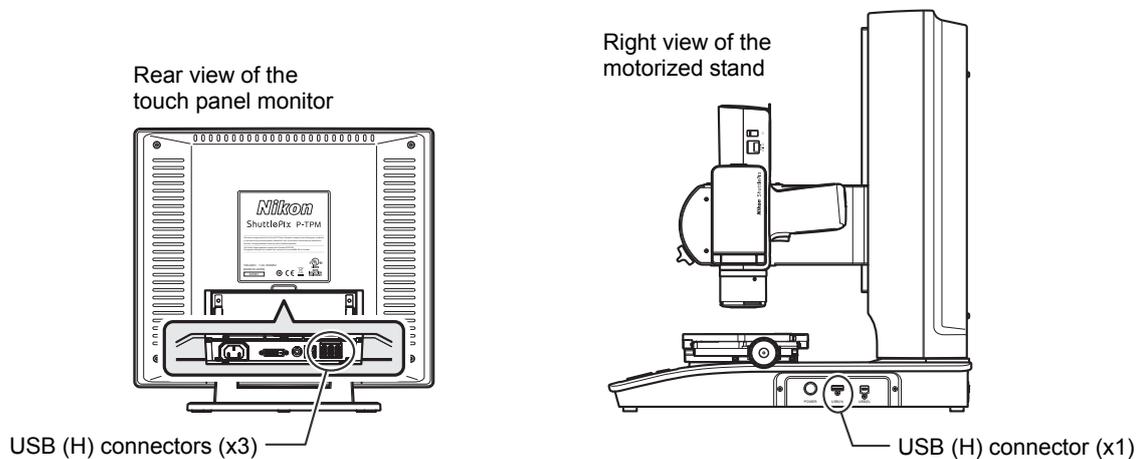
Be sure to hold the arm by hand while removing the P-400Rv/P-400R to protect the arm from excessive force being applied.



2.1.4 Connecting a Commercially Available USB Device

Commercially available devices (a mouse, a keyboard and a hub) can be connected to this system.

Connect a USB device to a USB (H) connector on the right side of the motorized stand or the USB (H) connector on the rear side of the touch panel monitor.



✔ Usage of the USB devices (mouse, keyboard, hub)

- Use a device whose operation has been checked by Nikon. (Not all USB devices are supported.)
- If the USB mouse is not recognized, disconnect the mouse and then reconnect it.

✔ Connection of the USB memory

See “2.4.2 Connecting a USB Memory” for details on the procedure for using a USB memory.

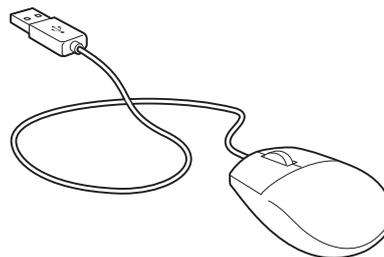
⚠ Precautions for the cable length of the USB devices

To satisfy EMC standards, use a mouse with a cable which is a maximum of 3 meters long.

(1) Connecting a USB mouse

This system allows you to work with the touch panel using a commercially available USB mouse.

When a USB mouse is connected, a mouse pointer appears on the screen. Move the mouse pointer by moving the mouse and click the mouse button to operate the menu.



Example of a USB mouse

✔ Usage of the USB mouse

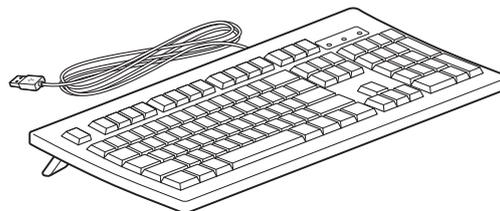
When using an optical mouse, always use the mouse pad dedicated to the optical mouse. Choose a fabric-based, dark-colored mouse pad with few patterns.

(2) Connecting a USB keyboard

Connecting a commercially available USB keyboard allows you to enter the numbers or comments directly from the keyboard.

Numbers and text can be entered using a keyboard when an entry keypad is displayed on the screen.

Note: Letters of alphabet, numbers and symbols displayed on the keypad can be entered. Other characters cannot be entered.



Example of a USB keyboard

✔ Keyboard layout

This system recognizes the keyboard layout in accordance with the setting using the [LANG] button in the [SETUP MENU: MAIN] window. (See “8.2.1 Switching the language” for details.) When [ENGLISH] is set for the display language, the US keyboard layout is used, and when [JAPANESE] is set, the Japanese keyboard layout (JIS keyboard layout) is used.

The positions of some keys in the US keyboard layout are different from those in the Japanese layout, and there is a difference in how you enter the symbols.

(3) Connecting a hub

When the number of USB connectors is insufficient, a commercial USB hub can be used to add USB connectors. Use a hub that supports USB 2.0. Connect the USB hub to the USB (H) connector of the motorized stand. Do not connect the USB hub to the USB connector of the touch panel monitor to avoid a two-tier hub structure.

2.2 Adjusting the Touch Panel Monitor

Switching input to the touch panel monitor
 The touch panel monitor has two input sources; DVI and video signals. The monitor switches the input source automatically by detecting the presence of either signal.

2.2.1 Adjusting the Image Quality of the Touch Panel Monitor

When the [SET] button is pressed on the front side of the monitor, the On-Screen Display (OSD) panel appears on the screen. The OSD panel can be operated by using the [SET], [+], [-] and [EXIT] buttons on the front.

- 1 Press the [SET] button.**
 The OSD panel is displayed.
- 2 Press the [SET] button again to select an adjustment item and adjust the value using the [+] and [-] buttons.**

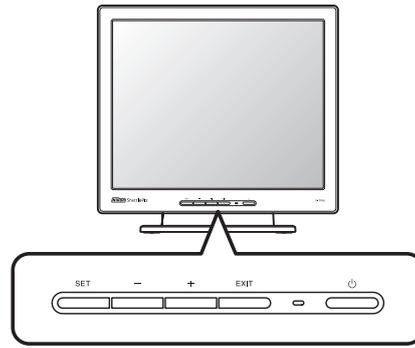
Each time you press the [SET] button, the focus of the adjustment item moves from the top to the bottom of the list. (Holding down the button will speed up the process.)

The value of the selected adjustment item blinks in red. The setting can be changed using the [+] and [-] buttons.

To save the changes and close the OSD panel, press the [SET] button when reaching the last adjustment item.

Otherwise, if the OSD panel is left for thirty seconds without pressing any button, the panel is closed and the values are saved automatically.

Note: To close the OSD panel without saving changes, press the [EXIT] button.



DVI signal	Video signal
ColorTmp 6500K	ColorTmp 6500K
Contrast 64	Contrast 64
ContrastR 63	ContrastR 63
ContrastG 61	ContrastG 61
ContrastB 58	ContrastB 58
Gamma 0	Gamma 0
BlackLevel 64	BlackLevel 64
Bright 16	Bright 16
TP Calib	HPosition 8
	VPosition 8

OSD panel display

Adjustment Items of the Touch Panel Monitor

Adjustment item	Meaning	Adjustable range	Initial value
ColorTmp	Color temperature	5000K/6500K/9300K	6500K
Contrast	Contrast (all colors)	0 to 127	64
ContrastR	Contrast (red)	0 to 127	63
ContrastG	Contrast (green)	0 to 127	61
ContrastB	Contrast (blue)	0 to 127	58
Gamma	Gamma value	-4 to 4	0
BlackLevel	Black level	0 to 127	64
Bright	Backlight brightness	0 to 31	16
HPosition	Horizontal position (only for video signal)	0 to 15	8
VPosition	Vertical position (only for video signal)	0 to 12	8
TP Calib	Positional calibration of the touch panel (only for DVI signal, See the next page.)	-	-

Restoring the initial value of the adjustment items
 Holding down the [+] and [-] buttons for more than three seconds while the OSD panel is not being displayed will reset all the setting items to the initial values.

2.2.2 Calibrating from the Touch Panel

It is necessary to calibrate the detection point so that a touch position is recognized correctly (touch panel calibration). If the position actually touched on the touch panel is different from the one detected on the touch panel, follow the procedure below.

1 Press the [SET] button to display the OSD panel, and select [TP Calib].

[TP Calib] blinks in red.

2 Press the [+] or [-] button.

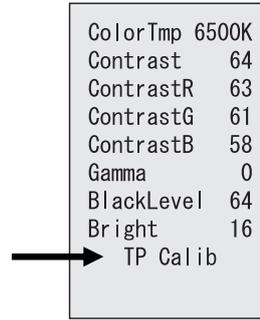
The adjustment mark is displayed at the center of the screen.

3 Point the center (intersection of the crosshairs) of the five adjustment marks using a stylus.

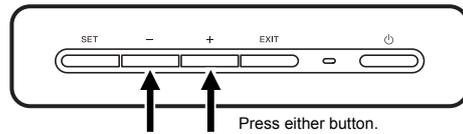
The adjustment mark will be displayed in the following order: (1) center ⇒ (2) bottom right ⇒ (3) bottom left ⇒ (4) top right ⇒ (5) top left. Be sure to touch the centers as accurately as possible using the stylus.

When the centers of all adjustment marks are pointed, a confirmation message "TP Calib. OK!" appears and calibration ends.

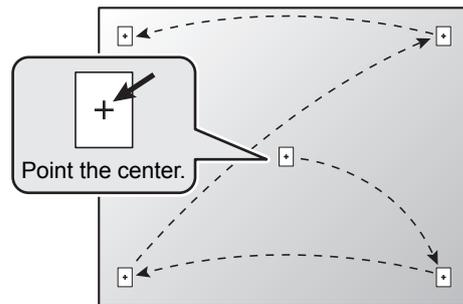
Note: Each one of adjustment marks is displayed for five seconds. When the screen is not touched for more than five seconds, a confirmation message "TP Calib. Error" appears and calibration ends.



Selecting [TP Calib]



Starting calibration



Calibration

✔ Touch panel calibration

Touch panel calibration can be performed only when the DVI signal is displayed. The detection position cannot be adjusted when the video signal is displayed.

2.3 Setting Display Language and Date and Time

The minimum necessary settings for handling the system are explained here.

Note: See “8 Changing Initial Settings” for other initial setting items.

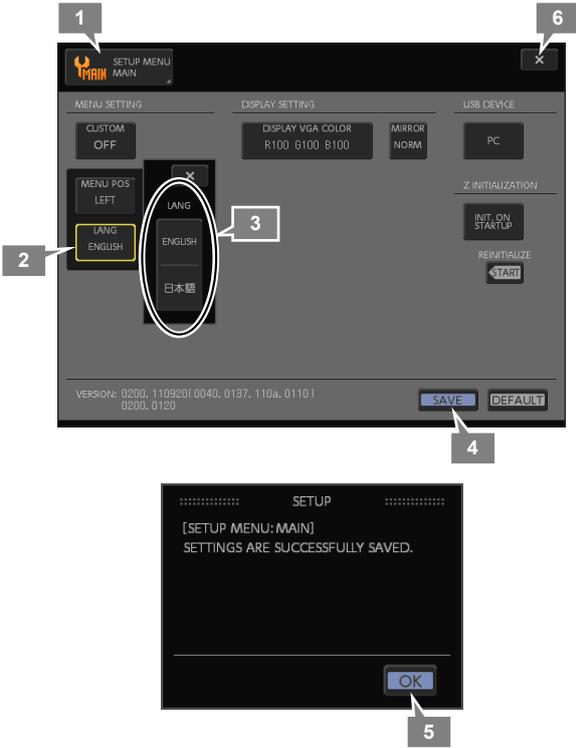
2.3.1 Setting Display Language

- 1 Display the [SETUP MENU: MAIN] window.**

Press the [SETUP MENU] button on the status bar to display the [SETUP MENU] window, press the [MENU SELECT] button and select [MAIN].
- 2 Select the [LANG] button.**

A submenu appears. Initially it is set to English.
- 3 Select the desired language from the buttons.**
- 4 Press the [SAVE] button to save the setting.**

The display language is changed and a confirmation message for saving the setting is displayed.
- 5 Press the [OK] button to close the confirmation message.**
- 6 Press the top right [X] button to close the [SETUP MENU: MAIN] window.**



Setting the display language

2.3.2 Setting Date and Time

- 1 Display the [SETUP MENU: ADDITIONAL] window.**

Press the [SETUP MENU] button on the status bar to display the [SETUP MENU] window, press the [MENU SELECT] button and select [ADD] (Additional).
- 2 Set the current date and time in the [DATE/TIME SET] area.**

Enter year, month, day, hour and minutes using two digits. For the year, enter the last two digits of the year.

Pressing the current value shows a keypad. Select digits and press the [ENTER] button.

Press the [CLR] button to clear what you have entered. Press the [BS] button to go back one digit. Press [X] to close the keypad without changing the value.
- 3 Press the [SAVE] button to save the setting.**

The date and time setting is changed and a confirmation message for saving the setting is displayed.
- 4 Press the [OK] button to close the confirmation message.**
- 5 Press the top right [X] button to close the [SETUP MENU: ADDITIONAL] window.**



Setting date and time

✔ **Setting time**

The date and time information is used when an image file is saved. Set the correct date and time.

✔ **Date and time setting in the P-400Rv/P-400R**

When the power to the motorized stand with the P-400Rv/P-400R attached is turned on, the date and time setting in the P-400Rv/P-400R changes according to the date and time setting in the motorized stand.

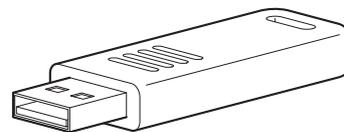
In addition, when the date and time is set in the [SETUP MENU: ADDITIONAL] window, the date and time setting in the P-400Rv/P-400R is changed accordingly.

2.4 Preparing the Recording Medium

Images captured by this system can be recorded on one of the two types of media described below.

• USB Memory

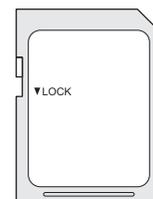
This is a FAT-formatted recording medium equipped with USB interface. In this system, a USB memory can be used by connecting it to a USB connector of the motorized stand or touch panel monitor.



USB memory example

• SD Card (SD memory card)

This is a small card-type recording medium used for digital cameras, portable devices, etc. An SD card can be inserted in the SD card slot of the camera head (P-400Rv/P-400R). This system is compatible with SDHC and supports an SD card of up to 16 GB.



SD card example

2

Preparing for Use

2.4.1 Handling Recording Medium

Cautions on handling a recording medium

⚠ Handling a recording medium

Note the following when using an external recording medium such as a USB memory or SD card:

- Carefully read the instructions for the recording medium to be used.
- Do not format an SD card on a PC.
- When formatting a USB memory on a PC, use FAT12, FAT16 or FAT32 format (collectively called FAT). Note that it may not be possible to select a format depending on the OS installed on the PC.
- Insert the recording medium in the correct orientation.
- Do not remove the recording medium or turn off the power while data is being written to it. This may cause loss of data or malfunction of the medium.
- Some types of recording media might not operate properly. Use a medium whose operation has been proven by Nikon.
- If the recording medium is not recognized, remove the card, and then insert it again. If it is still not recognized, replace the medium with another one.
- Do not touch the terminal of the SD card by hand or with a metal object.
- Do not attach a label or sticker to the SD card.

✔ Discarding or transferring the ownership of the recording medium to someone

Note that deleting data or initializing a recording medium using this system or a PC does not completely erase the data. Deleted files can sometimes be recovered from discarded recording media using commercially available software, potentially resulting in the malicious use of important data.

Before discarding a recording medium or transferring ownership to another person, erase all data using commercially available data deletion software, or initialize the medium and then completely fill it with images containing unimportant information.

Memory can be physically destroyed to make the data unrecoverable. Care should be taken to avoid injury or damage to you or others when physically destroying the recording medium.

Initializing the recording medium

In order to use a recording medium such as USB memory or SD card with this system, it is necessary to initialize (format) the recording medium using this system. See “2.4.4 Initializing Recording Medium” for details on how to initialize a medium.

✔ Taking a backup of data

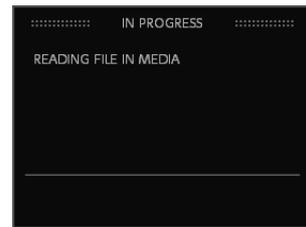
Data on a medium is completely erased when it is initialized. If it contains data you need to keep, take a backup of the data onto a PC or some other place.

Accessing the recording medium

This system reads the image files in the recording medium when this system is started or a recording medium is inserted.

The message shown on the right is displayed and no item can be selected on the menu while the image file is being read.

Note that it will take a long time if a recording medium contains a large number of files.



File being read

✔ Changing the storage folder according to the number of files

If there are more than 1,000 image files in a folder, it may take more than 10 minutes to read the files. Change the save folder depending on the number of the captured images, and do not store a large number of files in one folder.

Setting destination for saving images

This system allows you to connect multiple recording media and switch the save destination. You need to always specify the target recording media and the folder where the images are saved before starting capturing images.

See “4.2 Specifying the Destination to Save Images” or “5.4.2 Specifying a save folder” for details on the procedure for setting the destination for the image to be saved.

Errors with media

A warning message is displayed on the touch panel if an image cannot be saved or played back due to an error.

If a message like this appears, remove the medium once and then connect it again. If the same message appears again, that recording medium may not be usable any more.

In this case, use another recording medium or initialize the failed medium.



Warning message for recording medium

✔ Life of a recording medium

Flash memory, used in various types of recording media, has a limitation with regard to the number of writing operations that can be performed on it.

- If data is written on a flash memory repeatedly for a long time, data read or write failure may occur, reducing the reliability of the data.
- If an error still occurs even after the medium initialization, replace the medium.

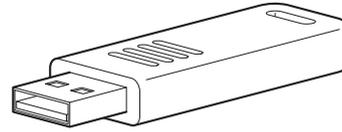
2.4.2 Connecting a USB Memory

Up to three USB memories can be connected to the system at the same time as media for recording and playing back images. Any FAT-formatted storage device compatible with USB 2.0 can be used as well as USB memory.

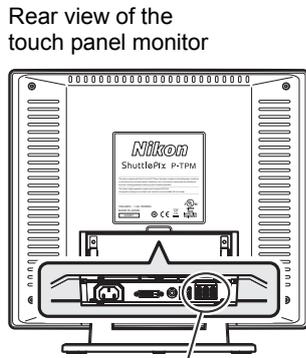
(1) Connecting and removing a USB memory

Connect a commercially available USB memory to the USB connector of the motorized stand or touch panel monitor.

Before removing a USB memory, make sure that access to the memory (for saving and playing back an image) is complete. Remove the USB memory taking care not to bend it sideways.

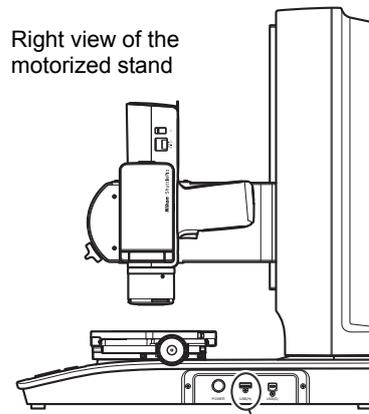


USB memory example



Rear view of the touch panel monitor

USB (H) connectors (x3)



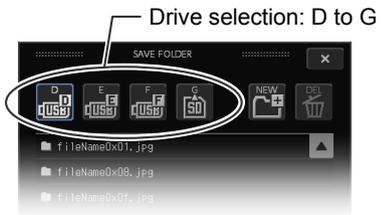
Right view of the motorized stand

USB (H) connector (x1)

USB connectors for connecting media

✔ Drive assignment for USB memories

This system recognizes USB memories by assigning the drive letters D, E and F in the order of detection. A USB memory is identified by a drive letter when setting the save destination or playing back an image.



Drive assignment example (Setting folder for saving)

✔ Accessing the recording medium

This system reads the files in the recording medium when this system is started or a recording medium is inserted. Note that it will take a long time if a recording medium contains a large number of files.

⚠ Removing a USB memory

This system allows you to connect and remove a USB memory even when the power is on. However, never remove a USB memory, when it is accessed for image recording or playback. It may cause data loss or system malfunction.

(2) Initializing a USB memory

Initialize a USB memory as necessary.

See “2.4.4 Initializing Recording Medium” for details on how to initialize recording media.

2.4.3 Inserting an SD Card

Use an SD card inserted in the SD card slot of the P-400Rv/P-400R as a recording medium. This system supports SDHC and SD card of up to 16 GB.

❗ No miniSD and microSD cards are usable

miniSD or microSD cards with a commercially available adapter cannot be used in this system. Use a full-size SD card.

✔ Insertion of SD cards

Remove the P-400Rv/P-400R from the motorized stand before inserting an SD card.

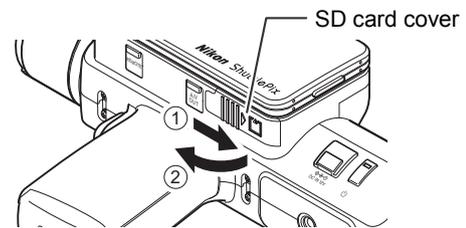
(1) Inserting the SD card

1 Make sure the power to the P-400Rv/P-400R is off.

Make sure the power indicator of the P-400Rv/P-400R is off.

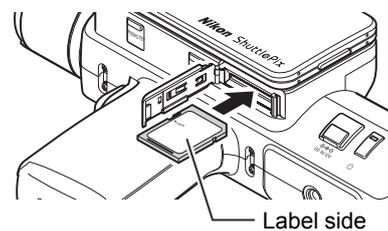
2 Open the SD card cover.

Slide the SD card cover in the direction of (1) and open it in the direction of (2).



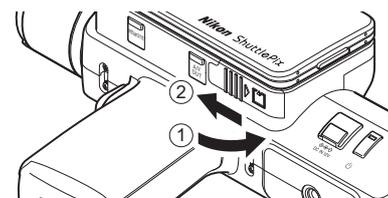
3 Insert an SD card.

Insert the SD card in the correct orientation as shown in the figure on the right. Push forward until it clicks.



4 Close the SD card cover.

Close the SD card cover in the direction of (1) and slide it in the direction of (2).



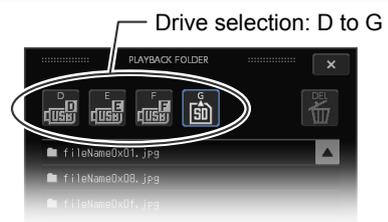
❗ Pay attention to the insertion direction of the SD card

The SD card cannot be inserted in the opposite orientation. If it is inserted forcibly in an incorrect orientation, there is a risk of damage to the SD card or the P-400Rv/P-400R.

✔ Drive letter for the SD card

An SD card is always assigned drive G.

A recording medium is identified by a drive letter when setting the save destination or playing back an image.



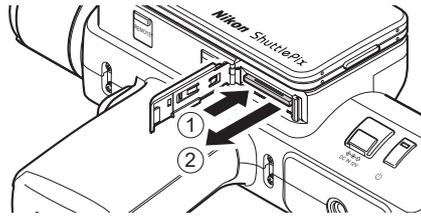
Drive assignment example (Setting playback folder)

(2) Removing the SD card

- 1 Turn off the power to the P-400Rv/P-400R.**
- 2 Open the SD card cover.**
- 3 Remove an SD card.**

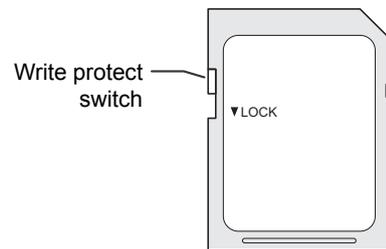
Press the inserted SD card deeper into the slot (1) and the card will pop out from the slot (2). Pull it out straight.

- 4 Close the SD card cover.**



(3) Precautions for handling the SD card

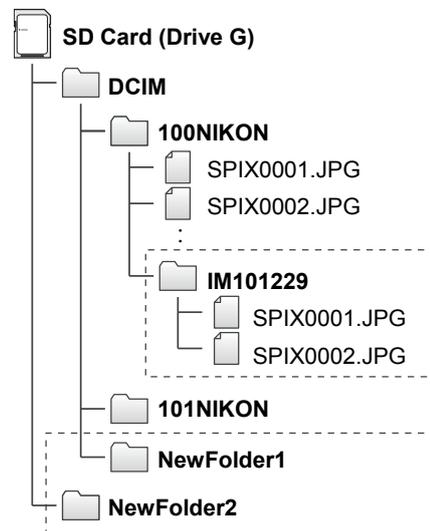
- The SD card has a write protect switch. Sliding this switch to the LOCK position prohibits the addition and deletion of the data, thus protecting images saved onto the SD card. When saving or deleting data to/from the SD card, unlock the write protect switch.
- Do not eject the SD card or turn off the system while the SD card is being initialized or while data is being written, deleted or loaded.



(4) Folder layout and initialization of the SD card

- When the P-400Rv/P-400R is used standalone, image data is read from or written to the “nnnNIKON” folder in the “DCIM” folder where “nnn” is a three-digit number. Data is not read from or written to other folders.
- When setting the image save destination for an SD card, set the “nnnNIKON” folder in the “DCIM” folder (where nnn is a three-digit number starting from 100) as the save folder so that saved images can be played back even when the P-400Rv/P-400R is used standalone.
- If an SD card is initialized with this system, the “DCIM” folder is created just below the root of the SD card and “100NIKON” folder is created in the “DCIM” folder. Do not delete these folders.
- SD cards used in other device must first be initialized with this system before use.

Note: See “2.4.4 Initializing Recording Medium” for details on how to initialize recording media.



Folders and image files in areas enclosed with dotted lines, that is, folders other than “nnnNIKON” under “DCIM,” are not recognized by the P-400Rv/P-400R when it is used standalone.

Example SD card folder layout

2.4.4 Initializing Recording Medium

Initialize a recording medium in the [SETUP MENU: FILE] window.

1 Display the [SETUP MENU: FILE] window.

Press the [SETUP MENU] button on the status bar to display the [SETUP MENU] window, press the [MENU SELECT] button and select [FILE].

2 Press the [FORMAT] button.

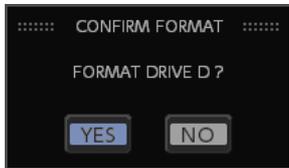
The [DRIVE] submenu appears. An icon for a drive that can be initialized is displayed in white. An icon for an empty drive is displayed in gray.

A recording medium connected to a USB connector is assigned drive D, E or F in the order of detection. An SD card in the P-400Rv/P-400R is always assigned drive G.

3 Press the button for the desired medium (any of drive D to G).

A confirmation message is displayed.

4 Press YES to initialize the recording medium or NO to cancel initialization.



When YES is selected, the recording medium is initialized.

5 Close [SETUP MENU: FILE] by pressing the [X] button.



Initializing recording medium

✔ In case of initialization failure

- A recording medium whose write protect switch is enabled cannot be initialized.
- Initialization may fail if a recording medium has an error. A warning message indicating a medium error is displayed in this case.

3

Basic Operations of the System

This chapter describes the basic operations of this system and the operation from the operation panel on the motorized stand.

3.1 Turning On and Off the Power

⚠ Caution – Never touch the system while it is moving.
 When the power to the motorized stand is turned on, the elevating section may go up and down for system initialization. In order to avoid hurting your hands and fingers, keep your hands off the device.

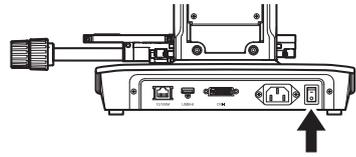
3.1.1 Turning On the System

Turn on the power to this system in the following way.

1 Make sure you completed assembly and connection.

2 Turn on the main power to the motorized stand.

The main power switch for the motorized stand is located on the rear side. To turn on the power, push the I side (upper side) of the switch.



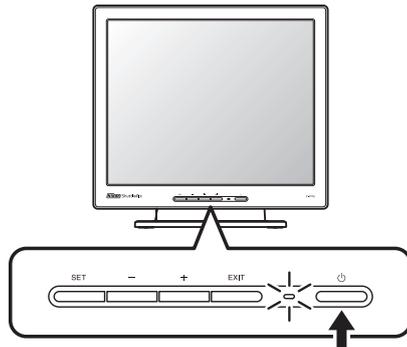
Turning on main power to motorized stand

3 Turn on the touch panel monitor by pushing its power switch marked ⏻.

When the monitor is turned on, the indicator lights and image of video signals input to the monitor appears.

The front indicator lights as follows in accordance with the input signal status:

Light color	Meaning
Green	Video signal input
Orange	No or unsupported video signal input



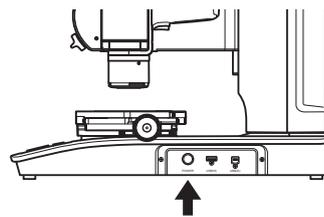
Turning on the touch panel monitor

4 Turn on the POWER switch on the right side of the motorized stand to power it on.

The indicator of the operation panel lights and the arm starts initialization (Initialization may not start depending on the configuration).

The startup screen of this system appears on the touch panel monitor and the screen shows a live image.

When the initialization of the arm is complete and the live image appears, the system is ready to be operated.



Turning on the motorized stand



Indicator status

Indicator lights.

❗ Initializing the arm position

- During initialization, the arm moves vertically to the top of the movable range, and returns to its original position. It is not necessary to remove the specimen from the stage before initialization; however, note that changing the specimen to a thicker specimen during initialization may cause the P-400Rv/P-400R to collide with the specimen.
- Depending on the setting, initialization is performed when the power is turned off.

✔ Reading images at start-up

When this system is started, the image files in the recording medium are read.

The message shown on the right is displayed and no item can be selected on the menu while the image file is being read.

Note that it will take a long time if a recording medium contains a large number of files.



File being read

✔ Date and time setting in the P-400Rv/P-400R

When the power to the motorized stand is turned on, the date and time setting in the P-400Rv/P-400R changes according to the date and time setting in the motorized stand.

❗ P-400R firmware

If a P-400R with an old version firmware attached to the motorized stand is used, a message may appear at power-on, making no operation possible. In such a case, turn off the power using the POWER switch of the motorized stand, remove the P-400R from the stand, and then upgrade the firmware.

3.1.2 Turning Off the System

Turn off the system in the following way.

1 Check the following items to make sure the power can be turned off.

- The pictures you have taken have been saved.
- There is no ongoing operation such as interval shooting.
- Network access has completed.

2 Turn off the motorized stand by pressing the POWER switch on the right side.

The screen of the touch panel monitor disappears and the power to the motorized stand is turned off.

When the power is off, the indicator of the operation panel goes off.

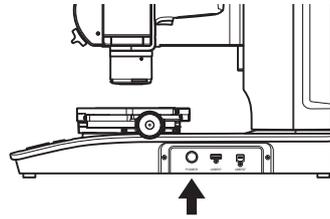
Depending on the configuration, the arm may start initialization. The power goes off after the initialization of the arm.

3 Turn off the touch panel monitor by pressing the power switch .

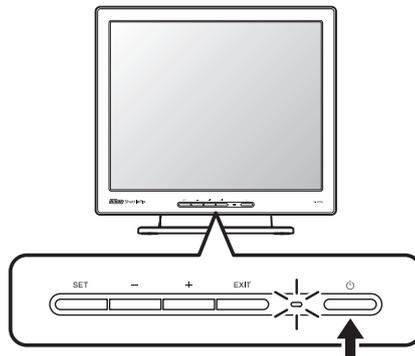
The power to the touch panel monitor goes off and the indicator on the front side goes off.

4 Turn off the main power switch for the motorized stand if the system is not to be used for a long time.

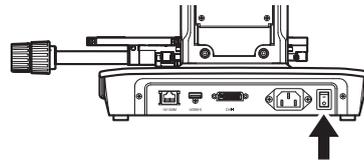
The main power switch for the motorized stand is located at the rear side. To power it off, push the O side (lower side) of the switch.



Turning off the motorized stand



Turning off the touch panel monitor



Turning off the main power to the motorized stand (when not in use for a long time)

⚠ System reboot

Do not power on the motorized stand immediately after it is turned off at the [POWER] switch.

To reboot the motorized stand, turn off the power using the [POWER] switch, check that the power indicator on the operation panel and the P-400Rv/P-400R power indicator are turned off, and then press the [POWER] switch to power on the motorized stand.

If the motorized stand is powered on using the [POWER] switch before these indicators turn off, the system may not start correctly. In such a case, follow the instructions above.

✔ Main power of the motorized stand

It is not necessary to turn off the main power switch for the motorized stand in normal use.

- Turn the main power off only when it is not to be used for a long period or the power cord is to be disconnected.
- The internal clock of the system may fail to keep correct time in a few days while the main power is off.

✔ Auto power saving

The system enters standby mode when it is not operated for a predetermined time. The system returns from standby mode and becomes ready for operation when the [Capture] button on the operation panel or a mouse is used in the standby state.

The time to enter standby mode since the last operation can be changed in initial setup. See “8.5.5 Configuring Other Settings.”

3.2 Operating the Touch Panel Monitor Screen

Configure settings related to live images, and play or edit captured images by touching a menu displayed on the touch panel using a stylus.

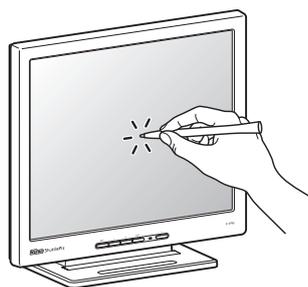
✔ Switching Input to Touch Panel Monitor

The touch panel monitor has two input sources; DVI and video signals. The monitor switches the input source automatically by detecting the presence of either signal.

3.2.1 Operation Using the Stylus

Use the supplied P-ST Stylus to work with the screen of the touch panel monitor.

To select buttons or menu items, gently touch the corresponding positions on the screen using the stylus.



Stylus operation

⚠ Stylus operations

- Do not strike or push the touch panel screen too hard.
- Use the supplied stylus to tap the touch panel. Never use a sharp-pointed object, such as a ballpoint pen, to touch the panel screen.
- If the stylus is not available, touch the panel with tip of your finger. Be careful not to let your finger nail scratch the screen.

3.2.2 Operation Using a Mouse

A USB mouse can be used to work with the screen instead of the stylus.

Use a mouse to move the cursor and click on the monitor using the mouse button instead of touching the screen using the stylus. Drag your mouse instead of moving a stylus on the monitor surface for operations such as specifying a value on a slider or adding an annotation with a pen.

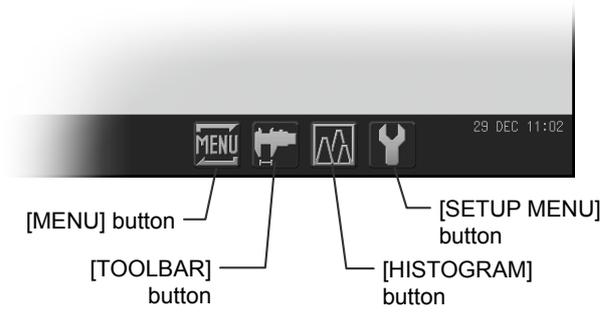
✔ Using a USB mouse device

- When using an optical mouse device, use a mouse pad designed for optical mouse devices. Choose a fabric-based, dark-colored mouse pad with few patterns.
- If the mouse is not detected when connected, disconnect it and then connect it again.

3.2.3 Displaying the Menu Screen

Press a button on the status bar to display a menu screen. There are the following buttons:

- [MENU] button**
 The operation menu appears on the top left (or top right) of the screen. The location of the menu changes left or right each time the button is pressed.
- [TOOL BAR] button**
 The toolbar appears on the top right of the screen. The location of the menu changes up and down each time the button is pressed.
- [HISTOGRAM] button**
 The histogram view appears on the top right of the screen. The location of the view changes up and down each time the button is pressed.
- [SETUP MENU] button**
 The Setup menu appears. Other menus disappear when the setup menu appears.



Buttons on the status bar

✔ Tooltips

Pressing and holding down a button on the touch panel displays a short explanation called tooltip below the button. If you are not sure about the function of a button, display the tooltip to check its function.

When using a mouse, placing the mouse pointer on a button shows the tooltip. To press the button, click the mouse button.



* The setup menu is not displayed when other menu is displayed.

Display items of the touch panel monitor

3.2.4 Switching the Menu

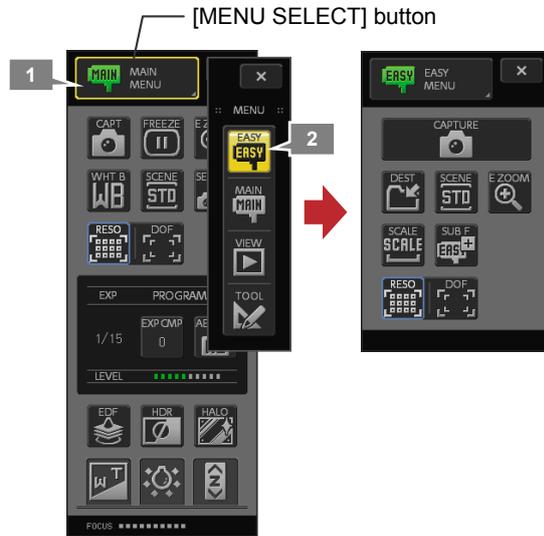
The title part of the operating and setup menus has a menu selection button. Switch between an operation menu and the setup menu by pressing this button.

- 1 Press the [MENU SELECT] button in a menu window.**

The [MENU] submenu opens.

- 2 Press a desired button.**

The menu switches to the desired menu.



**Example: switching menu
([MAIN MENU] → [EASY MENU])**

3 Basic Operations of the System

Operation menus

The following menus are provided.

[EASY MENU]



Menu for easily viewing and capturing an image without complicated settings

[MAIN MENU]



Menu for observing and capturing an image with advanced settings

[VIEW MENU]



Menu for playing back captured images

[TOOL MENU]

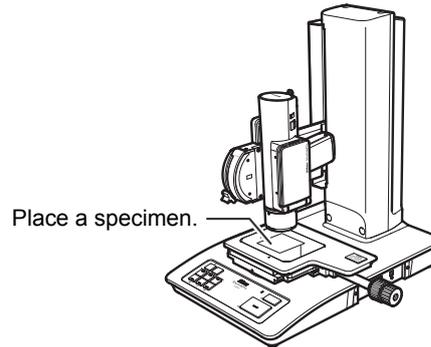


Menu for simplified measure on an image or adding annotations to an image

3.3 Placing a Specimen on the Stage

Place a specimen on the stage and observe the live image on the touch panel.

Leave enough space between the P-400Rv/P-400R and the surface of the stage to prevent the P-400Rv/P-400R from colliding with the specimen.



✔ Vertical move of the P-400Rv/P-400R

- When placing a thick specimen on the stage, move the P-400Rv/P-400R upward to secure enough space between the P-400Rv/P-400R and the upper surface of the stage (see “3.6 Focusing the Camera”).
- The focus position of this system is 29 mm off the end of the P-400Rv/P-400R. If you pre-adjust the distance between the upper surface of the specimen and the P-400Rv/P-400R approximately to 29 mm, focusing becomes quicker and easier.

ⓘ Initializing the arm position

- Normally, when the motorized stand is turned on, initialization of the arm position starts. During initialization, the arm moves vertically to the top of the movable range and then returns to its original position. It is not necessary to remove the specimen from the stage before initialization; however, note that changing the specimen to a thicker specimen during initialization may cause the P-400Rv/P-400R to collide with the specimen.
- Depending on the setting, initialization is performed when the power is turned off.

ⓘ Never use the contact observation adapter.

Before using the P-400Rv/P-400R mounted on the motorized stand, be sure to remove the contact observation adapter. If the arm with the contact observation adapter attached is moved, the contact observation adapter may collide with the specimen or stage and be broken. This may cause damage to the adapter or malfunction of the arm.

3.3.1 Moving the 3x2 Stage

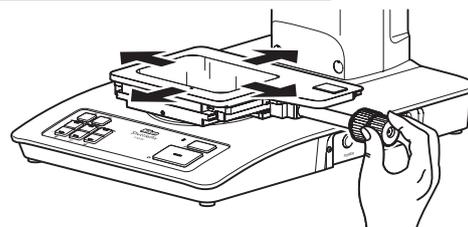
On the 3x2 stage, the upper plate of the stage can be moved horizontally by using the stage moving knob.

Check the display on the touch panel monitor and manipulate the knob so that the desired position is displayed on the screen.

The upper plate moves 76 mm right or left by X knob operation, and 51 mm forward or backward by Y knob operation. The travel distance per knob rotation is 37.5 mm to the right or left direction and 24.1 mm to the front or back direction.

Travel distance of the 3x2 stage

- Right and left: 76 mm
- Forward and backward: 51 mm



Moving the 3x2 stage

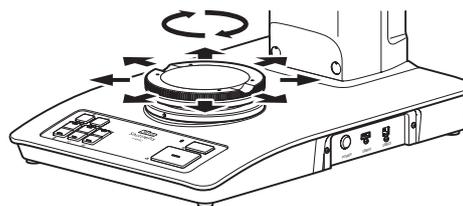
ⓘ Do not move the stage directly by hand.

To move the stage, use the stage moving knobs without fail. Holding the upper plate of the stage by hand and moving it may result in failure.

3.3.2 Operating the Sliding Stage

The sliding stage allows the upper plate of the stage to move (or slide) horizontally in the range of 20 mm diameter.

Check the display on the touch panel monitor and move the upper plate of the sliding stage by hand so that the desired position is displayed on the screen.



Operating the sliding stage

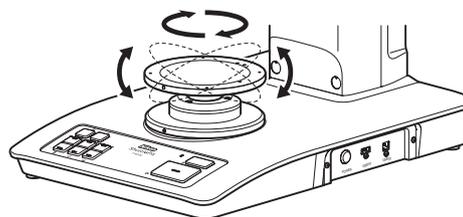
✔ How to use the stage plate

The upper and lower surfaces of the stage plate of the sliding stage are colored black and white, respectively. Use either side depending on the specimen to be observed.

3.3.3 Operating the Tilting Stage

The tilting stage can rotate 360° with its upper plate tilting up to 30°.

Place the specimen on the upper plate of the stage and tilt the stage to the desired angle. The stage can be rotated 360° in this state.



Operating the tilting stage

✔ How to use the stage plate

The upper and lower surfaces of the stage plate of the tilting stage are colored black and white, respectively. Use either side depending on the specimen to be observed.

✔ How to use the nonslip sheet

- If necessary, attach the nonslip sheet supplied with the stage to the upper plate of the stage.
- The nonslip sheet of the tilting stage can be reused multiple times on the stage plate. When the adhesion force of the nonslip sheet decreases, rinse the adhesive surface with water, or clean it using neutral detergent if it is particularly dirty. This will restore the adhesion force.

⚠ Precautions for the stage

The stage of the tilting stage could fall off when the motorized stand is tilted because it is not fixed to the base. Do not move the motorized stand with the stage left on the base.

3.4 Adjusting the Illumination

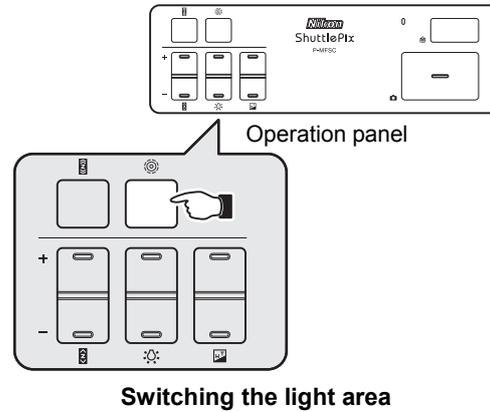
A ring illuminator that uses 8 white LEDs is attached around the lens of the P-400Rv/P-400R. The procedure for adjusting the light area and brightness from the motorized stand is described here.

- 1 Press the [LIGHT AREA] button (☉) on the operation panel of the motorized stand to switch the light area.**

Every time you press the button, the light area changes in the following order:

- **Light area**
 ALL LEDs ⇒ Upper-half LEDs ⇒
 Lower-half LEDs ⇒ Left-half LEDs ⇒
 Right-half LEDs ⇒ No LEDs ⇒ All LEDs

Select a light area while checking the illumination with the live image.

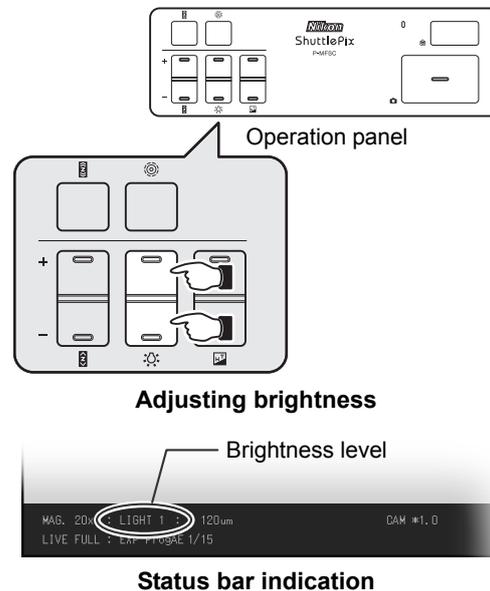


- 2 Press the [LIGHT CONTROL] button (☼) on the operation panel of the motorized stand to adjust brightness.**

Adjust the brightness while checking it with the live image.

The brightness can be adjusted in the range of 10 levels (1 to 10). If the button is pressed continuously, the brightness changes at a 0.5 sec. interval.

The current brightness level is indicated on the status bar.



☑ Illumination in Hi-reflection sample mode

The brightness is fixed to 10 when Hi-reflection Sample is selected as the scene mode. If the light control button is pressed in this mode, an alert message is displayed.

☑ Settings at power-on

The settings of the light area and brightness are saved when the power is turned off. The saved illumination state is applied when the power is turned on again. Because strong light may be emitted depending on the saved setting, do not look at the light source directly.

☑ Operations on the touch panel

The [MAIN MENU] can also be used to switch the light area and adjust the brightness. See “5.2.1 Adjusting the Illumination” for details.

⚠ Illumination for observing a specimen with a polished surface

When observing an object with a high reflection ratio such as a specimen with a polished surface under low magnification, if the ring illuminator is used in the P-400Rv/P-400R, an LED image may be reflected. In this case, use another illuminator.

3.5 Operating the Zoom

The P-400Rv/P-400R contains a 20x optical zoom lens. The procedure for adjusting the zoom magnification from the motorized stand is described here.

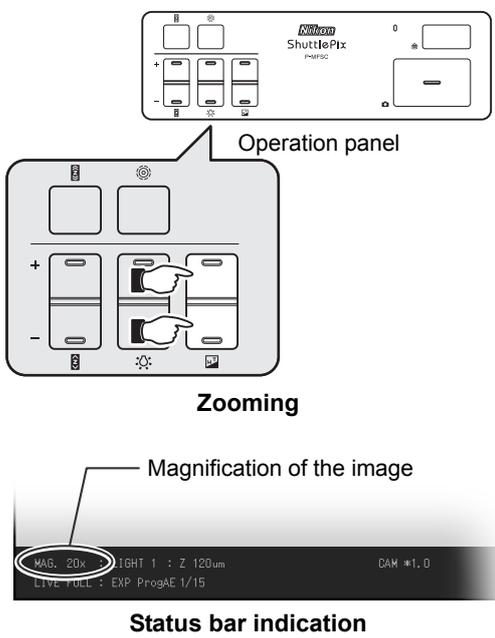
- 1 Check the position of the specimen with the live image.
- 2 Press the [ZOOM] button () on the front of the motorized stand to adjust the zoom magnification.

Adjust and set the zoom magnification while checking the live image so that the desired position is displayed on the screen.

Zoom magnification is selectable from the following 16 levels: 1, 1.2, 1.5, 1.8, 2, 2.5, 3, 4, 5, 6, 8, 10, 12, 15, 18, and 20. If the button is pressed and held over 1 second, the zoom magnification changes consecutively.

The current magnification of the live image is indicated on the status bar.

Note: When the display size is 1280x960, the magnification of the displayed image is 20x of the zoom magnification. The magnification of the electronic zoom is not included in the display magnification.



3 Basic Operations of the System

Settings at power-on
 The zoom magnification is reset when the power is turned off. The zoom magnification is 1x when the power is turned on again.

Operations on the touch panel
 A zoom magnification can also be selected from the [MAIN MENU]. See "5.2.2 Adjusting the Zoom" for details.

Operating the electronic zoom

A live image or playback image can be enlarged using the [E ZOOM] button of the [EASY MENU].

When the [E ZOOM] button is pressed, the corresponding submenu appears, which provides the magnifying glass icon buttons to increase or decrease the display magnification, the [C] button to clear the magnification setting, and the arrow buttons to change the display position.

The electronic zoom is a function that enlarges a part of the actual image. The higher the magnification ratio is, the poorer the quality of the image becomes. An image cannot be reduced to less than the actual size.



Note: The magnification of the electronic zoom is indicated in the middle of the status bar.

- Operating the electronic zoom**
- The [E ZOOM] button is included in every operation menu ([EASY], [MAIN], [VIEW], and [TOOL]).
 - The electronic zoom feature is only effective for the screen display. Even though the image enlarged using the electric zoom is captured, the zoom cannot be applied to the saved image.

3.6 Focusing the Camera

⚠ CAUTION – Never use the contact observation adapter.

Before using the P-400Rv/P-400R mounted on the motorized stand, be sure to remove the contact observation adapter. If the arm with the contact observation adapter attached is moved, the contact observation adapter may collide with the specimen or stage and break. This may cause damage to the adapter or malfunction of the arm.

Move the P-400Rv/P-400R vertically so that the camera can focus on the specimen. The procedure for focusing the camera from the motorized stand is described here.

✔ Focus position

The focus position of the P-400Rv/P-400R is 29 mm off the end of the lens.

- 1 Check the position of the specimen with the live image.
- 2 Press the [VERTICAL MOVE] button () and the [COARSE] button () on the front of the motorized stand to adjust the position of the P-400Rv/P-400R so that the camera can focus on the desired position.

- **Moving the P-400Rv/P-400R coarsely**
Press the [COARSE] button together with the [VERTICAL MOVE] button.
- **Moving the P-400Rv/P-400R finely**
Press the [VERTICAL MOVE] button only.

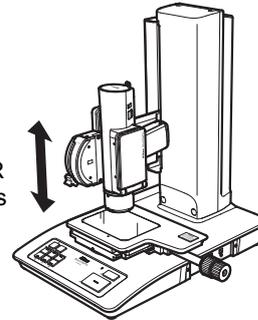
The movement speed is between 0.8 and 10 mm/sec. for coarse movement and between 0.08 and 5 mm/sec. for fine movement (It varies depending on the zoom magnification.). Adjust the focus of the camera while checking the live image.

The current arm position (Z-axis position) is indicated on the status bar in units of μm .

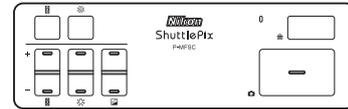


Status Bar Indication

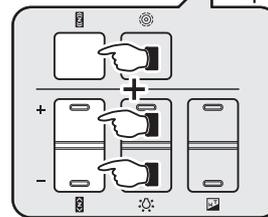
Move the P-400Rv/P-400R vertically to focus the camera.



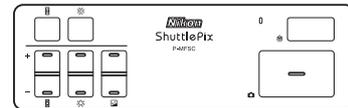
■ Moving the P-400Rv/P-400R coarsely



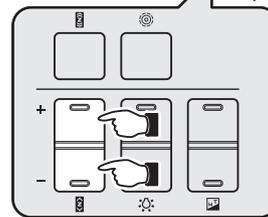
Operation panel



■ Moving the P-400Rv/P-400R finely



Operation panel



Focusing the camera

✔ Display of the Z-axis position

- When the arm position is initialized, the in-focus position of the upper surface of the 3x2 stage (and sliding stage) is treated as zero and the current Z position in relation to the zero position is displayed. Note that due to product variation, the current position may not be displayed as zero even when the upper surface of the stage is in focus.
- If no initialization is set to be performed, the Z-axis position at the time the power is turned on is used as the zero position.

✔ Operating the touch panel

The arm of the P-400Rv/P-400R can be moved vertically also from the [MAIN MENU]. See “5.2.3 Focusing the Camera” for details.

3.7 Capturing an Image

Capture the image displayed on the touch panel monitor and save it to a recording medium as an image file.

❗ Confirmation of the basic settings

Before capturing an image, confirm the following settings.

- **Save folder selection**
(See “4.2 Specifying the Destination to Save Images” or “5.4.2 Specifying a save folder.”)
- **Image quality mode (file type) selection**
(See “5.4.2 Selecting an image quality mode (file type).”)
- **Image storage size selection**
(See “5.4.2 Selecting a size of the image to be saved.”)

❗ Precautions for saving images

While an image is being saved, do not remove the recording medium or network cable. Doing so may cause improper image recording or damage to this system or to the recording medium.

✔ Names of image files

This section describes how to capture images using the buttons on the operation panel of the motorized stand.

When images are captured using a button, they are always named automatically. For details on the procedure for changing the file naming convention, see “8.4.2 Configuring File Naming System and Convention.”

✔ Capture sound

A capture sound is emitted when an image is captured. To change sound volume, see “8.5.5 Configuring Other Settings.”

✔ Using the annotation function and the simplified measurement function

When pen drawing, text annotation, or distance or angle measurement is performed, the results can be embedded in the image to be saved.

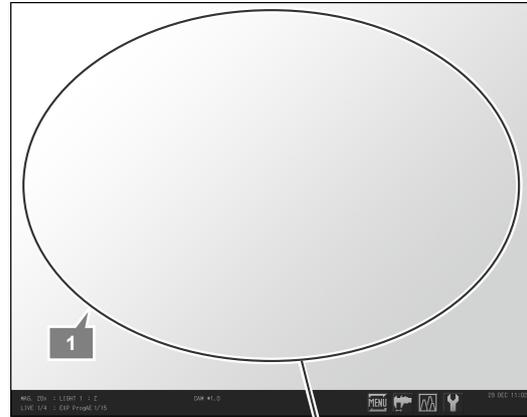
See “7 Using Annotation and Simplified Measurement” for details about the annotation function and simplified measurement function.

3.7.1 Capturing a Live Image

Press the [CAPTURE] button on the operation panel to capture the live image displayed on the touch panel monitor.

1 Check the live image displayed on the touch panel monitor.

Check that the object is displayed at the proper brightness and with focus on the desired part.



Check the live image.

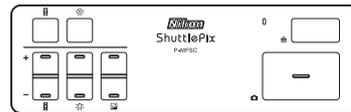
Checking the live image

2 Press the [CAPTURE] button on the operation panel on the front side of the motorized stand.

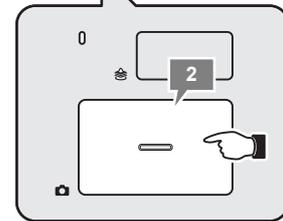
A capture sound is emitted when the image is captured and the captured image is saved in the specified save destination.

While the image is being saved, the pointer shape changes and the “Saved..1/1” message appears on the status bar.

After the image is saved, the system returns to the operable state.



Operation panel



Capturing the live image

3.7.2 Capturing EDF Images

The motorized stand provides a dedicated button for creating an EDF image easily with one-button operation.

An EDF (Extended Depth of Focus) image is an all-in-focus image created by combining multiple images of an object captured at different focus points.

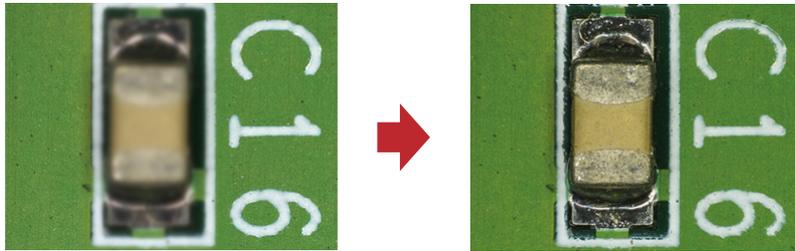


Figure: Examples of normal image and EDF image

When the [EDF] button is pressed on the motorized stand, the system calculates the depth of focus of the lens in accordance with the zoom magnification information, and moves the arm of the stand to suitable positions for capturing. When the button is pressed again, the capturing terminates and the EDF image is automatically created and displayed on the touch panel monitor. To save the EDF image, capture it in this state.

❗ Image size of EDF images

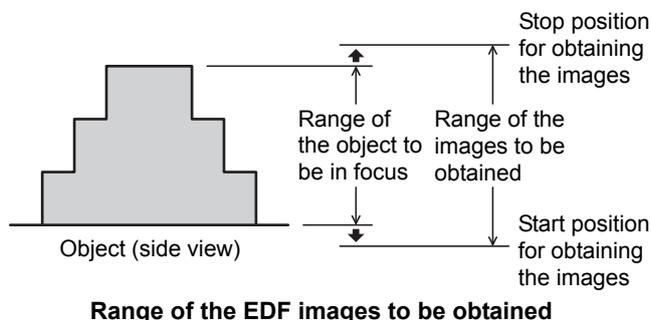
Only EDF images of 800x600 (0.5M) can be captured using this system. Even though the size is set to [FULL] (2M), the display size automatically changes to 800x600 when EDF image capturing starts. After an image is captured, the display size returns to the original size when the EDF image is closed.

(1) Notes on capturing EDF images

When capturing an EDF image, note the following points.

1. Set a value larger than the range of the EDF images to be obtained.

- Start position for obtaining the images:**
 When starting to obtain EDF images, focus on the lower position of the object. Adjust the focus to a position slightly lower than the start of the range to be in focus.
- Stop position for obtaining the images:**
 After capturing the object in the specified range, confirm that one or two extra images were captured, and then stop the operation.



2. Notes on the object of the EDF images

- This system creates EDF images using the patterns on the object surface. EDF images or 3D image generation data may not be correctly generated if an object that has no patterns, such as a mirror or glossy surface, is used.
- EDF images or 3D image generation data may not be correctly generated if an object is white and bright or black and dark. In this case, change the exposure and try again.

3. Notes on the setting for capturing

- When "DOF-priority" is set for the aperture, the image quality may not be as high as in "Resolution-priority." In this case, a confirmation message is displayed in the [EDF] menu. Select "Resolution-priority" for the aperture and widen the range (height) of the object to be captured if required.
- Setting the creation mode to [FINE] in the [EDF] menu shortens the image acquisition intervals. As a result, clear images can be obtained.

(2) Capturing EDF images

To capture an EDF image, perform the following procedure.

1 Place the specimen (object) on the stage.

2 Check the live image and make adjustment to obtain a proper view of the object.

Adjust the illumination and set a zoom magnification.

3 Move the [VERTICAL MOVE] button to adjust the camera head to the slightly lower position of the range to be in focus.

Obtain the image of a wider range than that to be in focus.

4 Press the [EDF] button (👆) on the front of the motorized stand to start EDF image capturing.

The camera head moves upward intermittently and captures an image each time it stops.

The [EDF] menu appears on the touch panel monitor and the capture state is displayed.

Note: When EDF image capturing is started, the display size automatically changes to 800x600.

✔ Setting the aperture

When image capturing is started with the aperture set to [DOF], the following message is displayed at the lower part of the [EDF] menu.

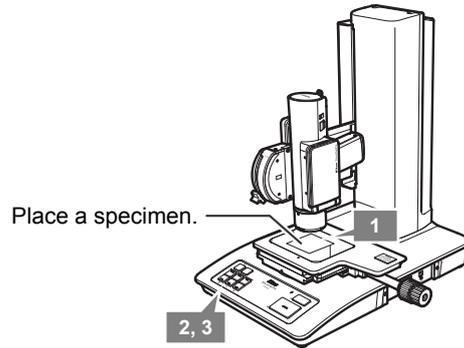
- IN DOF MODE, IMAGE MAY NOT BE AS CLEAR AS IN RESO MODE.

If your priority is image quality, change the aperture to [RESO] and start capturing the EDF images again.

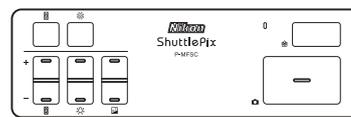
Note: See “4.3 Selecting a Scene Mode” or “5.3.2 Switching the Aperture Setting” for details on the procedure for changing the setting.

5 Check the live image and wait until the entire range to be focused has been captured.

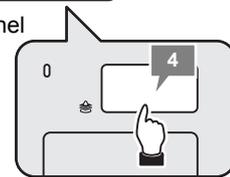
The live image is displayed on the touch panel monitor during capturing.



Preparing an object

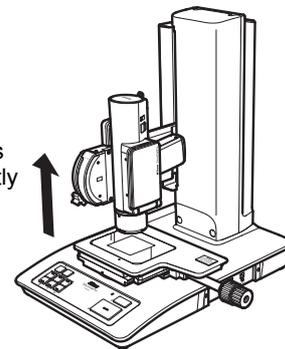


Operation panel

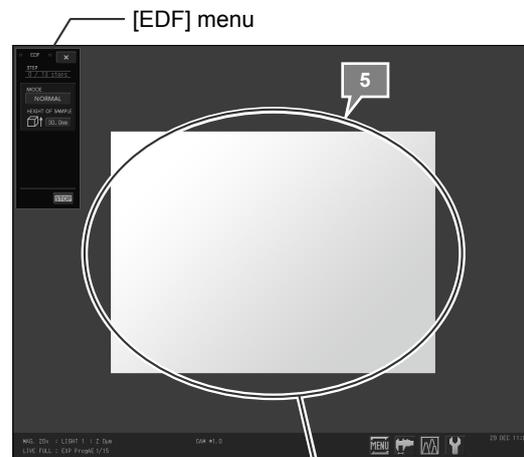


Starting obtaining images

The P-400R moves upward intermittently and captures an image each time it stops.



Capturing EDF images



Check the capture state with the live image.

Checking the live image during capturing

- 6 To finish the capturing, press the [EDF] button again or press the [STOP] button in the [EDF] menu.**

After the images in the specified range are captured, confirm that one or two extra images were captured, and then stop the operation.

✔ Automatic stop of EDF capturing
When the arm moves up 30 mm, capturing finishes automatically.

The EDF image is automatically created based on the captured images and displayed on the touch panel monitor. [EDF] is indicated in the middle of the status bar while the EDF image is displayed.

When the EDF image is generated, the display of the [EDF] menu changes and a checkbox for selecting whether to record the 3D image generation data, the [RETRY] button and the [CAPT] button appear at the bottom of the menu.

✔ Error at the time of EDF capturing
An error occurs if no image is captured during EDF capturing operation.

- 7 Check the captured EDF image.**

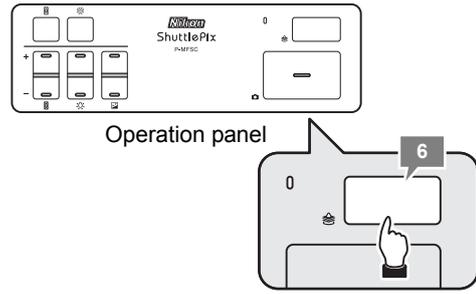
Check that the image is captured as desired.

- 8 To obtain the EDF image again, press the [RETRY] button.**

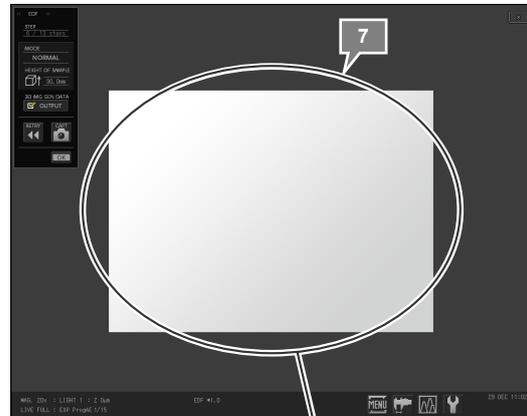
The EDF image previously obtained is deleted. Perform the procedure from step 2 again.

- 9 Select whether to save the 3D image generation data with the [3D IMG GEN DATA]-[OUTPUT] checkbox in the [EDF] menu, and press the [OK] button.**

If the [OUTPUT] checkbox is selected, the 3D image generation data file of the same name as the image file is saved with an extension of “.d3d” when the EDF image is saved.

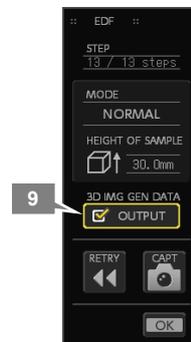


Stopping obtaining images



Check the EDF image state.

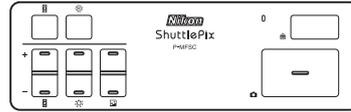
Checking the EDF image



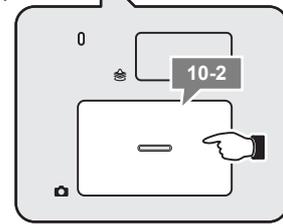
Output setting of the 3D image generation data

- 10 To save the obtained EDF image, perform either of the following operations:**
- 1. Press the [CAPT] button in the [EDF] menu.**
 - 2. Press the [CAPTURE] button on the operation panel.**

The EDF image file and 3D image generation data file (when [OUTPUT] is selected) are saved in the designated destination folder.



Operation panel



Saving the EDF image

- 11 Press the [OK] button to close the [EDF] menu.**

The EDF image remains on the screen.

- 12 To close the EDF image, press the [X] button at the upper right corner of the window.**

A confirmation message is displayed. Press [YES] to close the EDF image.



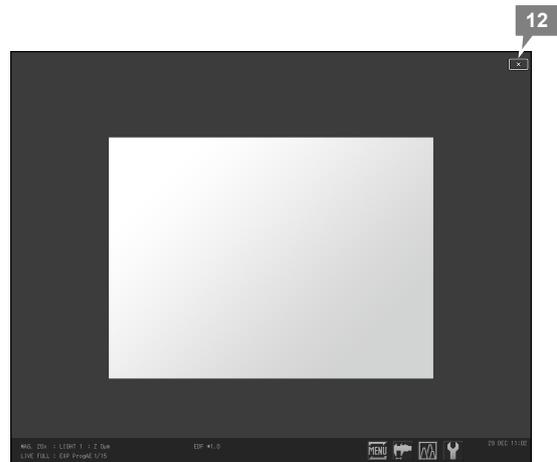
The live image returns and the display in the middle of the status bar changes from [EDF] to [CAM].

Notes

- Make sure that you save the EDF image before closing it. Closing the EDF image without saving it discards the captured image.
- If the display size was set to [FULL], the display returns to the original size when the EDF image is closed.



Closing the [EDF] menu



Closing the EDF image

❗ Obtaining and saving EDF images

- Depending on the object to be captured and capturing conditions, EDF images may not always be created correctly.
- The created EDF image cannot be saved until the [CAPTURE] button is pressed. To save the EDF image, press the [CAPTURE] button without fail.

✔ Advanced setting of the EDF image

Select the creation mode of the EDF image from the following three levels: [FINE], [NORM] (normal) and [FAST]. Capturing can automatically be stopped by the prior setting of the object height. See “5.5.3 Capturing EDF Images” for details.

✔ Analyzing the EDF image by the ShuttlePix Editor

When the 3D image generation data is saved, EDF images can be analyzed on a PC using the dedicated application “ShuttlePix Editor.” Based on the EDF image and 3D image creation data, 3D (three dimension) data, bird’s-eye views, contour lines of the object and cross section graphs of 3D images can be created.

4

Operating the EASY Menu

This chapter describes the procedures for observing or capturing images with simple operations using the [EASY MENU].

4.1 Operating the EASY Menu

Displaying the [EASY MENU]

To display the [EASY MENU] on the touch panel, perform the following procedure.

- 1 Press the [MENU] button on the status bar.**

The operation menu appears at the upper left (or right) corner.

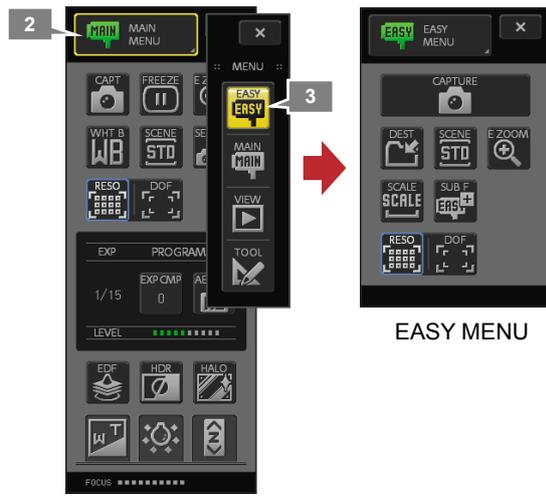


- 2 Press the [MENU SELECT] button on the operation menu.**

The [MENU] submenu appears.

- 3 Press the [EASY] button.**

The name of the operation menu changes to the [EASY MENU].



4

Operating the EASY Menu

Items in the [EASY MENU]

The [EASY MENU] provides a collection of frequently-used buttons in the [MAIN MENU] so that users can operate this system with simple operations.

- [MENU SELECT] button**
The name of the current menu is shown. Use this button to display the submenu, allowing you to switch between menus.
- [X] (close) button**
Close the menu.
- [CAPTURE] button**
Capture the live or still image shown on the screen and save it in the specified folder.
- [SCENE] button**
Select a scene mode and custom setting.
- [DEST] button**
Allow you to select a drive and a folder to save the image file.
- [E ZOOM] button**
Magnify the image. This button enables you to change the magnification and position to display.
- [SCALE] button**
Show the scale at the right bottom on the touch panel.
- [SUB F] button**
Accommodate a set of buttons for settings and special capturing.
- [RESO]/[DOF] button**
Switch the aperture setting between "Resolution-priority" and "DOF priority".

EASY MENU

4.2 Specifying the Destination to Save Images

Specify the destination to save images.

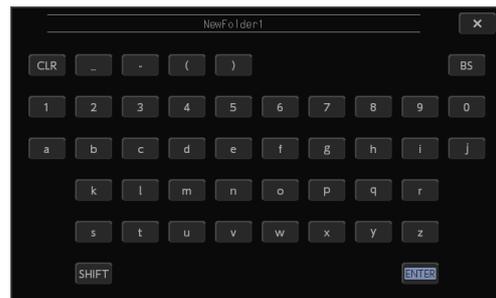
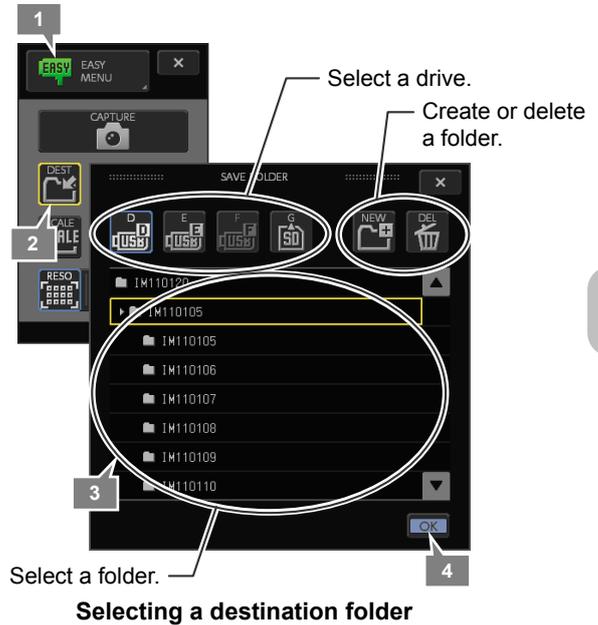
- 1** Open the [EASY MENU].
- 2** Press the [DEST] button.
The [SAVE FOLDER] submenu appears.
- 3** Specify a drive and a folder to save images in the [SAVE FOLDER] submenu.

- **Selecting a drive**
Select a drive letter of the recording medium (USB memory: D to F in the order of connection, SD card: G). The selected drive is marked with a blue frame.
- **Selecting a folder**
When a drive is selected, the folders within the drive are displayed. Select a folder from the list. The selected folder is marked with a yellow frame.
- **Creating a new folder**
A new folder can be created within the folder selected from the folder list. Press the [NEW] button in the [SAVE FOLDER] submenu. The keypad appears. Enter an arbitrary folder name and press the [ENTER] button.
- **Deleting a folder**
To delete the folder selected from the folder list, press the [DEL] button. A confirmation message appears. Press [YES] or [NO].

Note: Up to the 6th folder from the root folder are available for folder selection for the storage destination and new folder creation.

- 4** After selecting a drive and a folder, press the [OK] button to complete the setting.

The [SAVE FOLDER] submenu closes.



⚠ Finishing the setting

If the destination folder has been changed, press the [OK] button before closing the [SAVE FOLDER] submenu. If the [X] button is pressed to close the submenu, the destination folder will not be changed.

⚠ Changing the recording medium configuration

- When the recording medium assigned to the destination folder is removed, images are saved onto another recording medium if any. When the configuration of the recording medium is changed, be sure to check the destination setting.
- If all recording media are removed, an error occurs at the time of image capturing.

✔ Automatic folder creation

If the automatic folder creation is set to ON in the [SETUP MENU: FILE] window, a folder is created within the specified destination folder and the image file is saved in the created folder.

4.3 Selecting a Scene Mode

For typical specimens, several image capture conditions are provided as “scene modes.” Selecting a scene mode enables you to capture images with the settings suitable to the specimen.

- 1 **Open the [EASY MENU].**
- 2 **Press the [SCENE] button.**
The [SCENE] submenu appears.
- 3 **In the [SCENE] submenu, select a scene mode (or custom mode).**

- **Scene mode**
The following six modes are available:
[Standard], [Wafer/IC chip], [Metal ceramic], [Circuit board], [FPD] and [Hi-reflection Sample]. Normally select [Standard].
- **Custom mode**
To use a custom mode ([CSTM1] to [CSTM4]), it must have been registered. See “5.4.1 Using the custom setting” for details on the procedure for registering a custom mode.

- 4 **Press the [OK] button to complete the setting.**

The [SCENE] submenu closes.



Selecting a scene mode

✓ Finishing the setting

To change the setting of a submenu, press the [OK] button when closing the submenu. If the [X] button is pressed to close the submenu, the changed setting is discarded.

✓ Settings at power-on

The selected scene mode is saved when the power is turned off and the saved scene mode is applied when the power is turned on again. However, if the custom setting is set to be enabled at the time of startup, the custom mode setting is applied.

✓ Changing the scene mode setting

- After selecting a scene mode, the settings such as the exposure mode, exposure compensation, camera gain, and shutter speed can be changed. However, those changes cannot be saved to the scene mode.
- To save an arbitrary setting, use “Custom Setting.” See “5.4.1 Using the custom setting” for details on the procedure for using a custom setting.

✓ Image flickering during observation

Depending on the observation object, flickering may occur in the live image. (Flickering is noticeable in a homogeneous color sample.) Flickering can be prevented with either of the following methods.

- Change the exposure mode to “Manual” and decrease the shutter speed.
- Increase the illumination intensity.

Note that too slow shutter speed or too strong illumination intensity may cause overexposure. Adjust the shutter speed or illumination intensity to gain a proper exposure while checking the live image.

✓ Exif data

Data stored in the “Scene capture type” tag in Exif is different from those set in the ShuttlePix scene mode.

4.4 Selecting the Aperture

Select the aperture from “Resolution-priority” and “DOF-priority.”

- 1 **Open the [EASY MENU].**
- 2 **Press the [RESO] or [DOF] button to select an aperture.**
 - **[RESO] button (initial setting)**
Set the aperture to “Resolution-priority.” Compared to “DOF-priority”, the depth of field becomes shallow but the resolution becomes high.
 - **[DOF] button**
Set the aperture to “DOF-priority.” Compared to “Resolution-priority”, the resolution becomes low but the DOF becomes deep.



Selecting the aperture

✔ Settings at power-on

The aperture setting is reset when the power is turned off. The “Resolution-priority” will be automatically selected when the power is turned on again.

✔ Aperture setting and user shading compensation

Correct shading using either of the two types of settings: [STD] and [USER], in order to correct unevenness of sensitivity due to decrease in brightness towards the corners of the screen. (See “5.4.1 Correcting shading” for details.)

When using the [USER] setting (user shading compensation value), switching the aperture setting from the state in which the compensation value was set changes the shading state resulting in improper shading correction. In this case, measure the shading and set the compensation value again.

Note: A compensation value for the P-400Rv/P-400R ring illuminator for the aperture of “Resolution-priority” is set in the [STD] setting (standard shading compensation value).

4.5 Operating the Electronic Zoom

Using the [E ZOOM] button of the operation menu, a live image or playback image can be enlarged.

When the [E ZOOM] button is pressed, the corresponding submenu appears, which provides the magnifying glass icon buttons to increase or decrease the display magnification, the [C] button to clear the magnification setting, and the arrow buttons to change the display position.

The electronic zoom is a function that enlarges a part of the actual image. The higher the magnification ratio is, the poorer the quality of the image becomes. An image cannot be reduced to less than the actual size.

Note: The magnification of the electronic zoom is indicated in the middle of the status bar.



Operating electronic zoom

✔ Operating the electronic zoom

- The [E ZOOM] button is included in every operation menu ([EASY], [MAIN], [VIEW], and [TOOL]).
- The electronic zoom feature is only effective for the screen display. Even though the image enlarged using the electric zoom is captured, the zoom cannot be applied to the saved image.

4.6 Switching Scale Indication

Set whether to show the scale during observation and image capturing.

- 1 Open the [EASY MENU].
- 2 Press the [SCALE] button.

The [SCALE] menu appears.

- 3 To show the scale on the screen, select the [DISPLAY] checkbox in the [SCALE] menu.

If it is not necessary to display the scale, clear the checkbox.

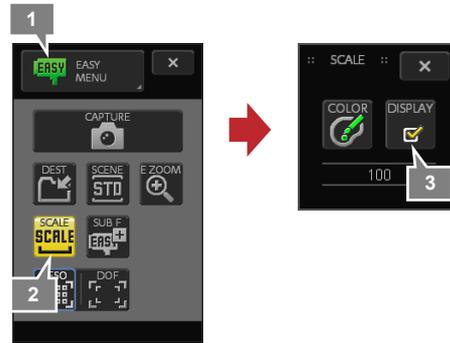
- 4 Perform the following scale-related settings in the [SCALE] menu.

- **Selecting a display color**
Press the [COLOR] button and select a color of the scale in the [COLOR] submenu. Select a color from the six colors: black, red, yellow, green, blue, and white.
- **Setting the display size**
Enter a display size with a numeric value. When the number at the bottom of the [SCALE] menu is pressed, the keypad appears. Enter the value and press the [ENTER] button.
To delete the entry, press the [CLR] button. To move backward by one character, press the [BS] button. Pressing the [X] button closes the keypad without changing the value.

The change of the setting is immediately reflected to the scale display.

- 5 Press the [X] button.

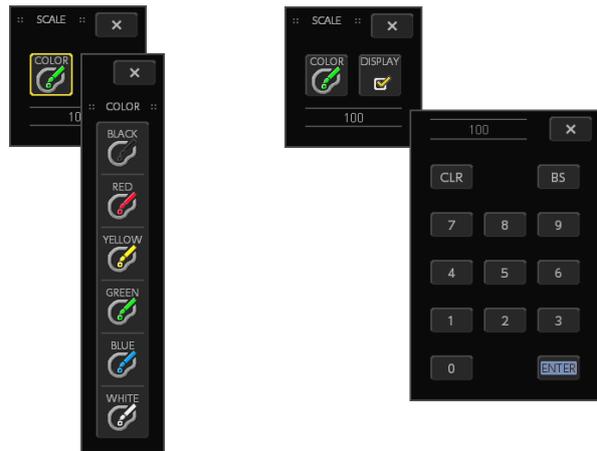
The [SCALE] submenu closes.



Displaying the scale



- **Selecting a display color**
- **Setting the display size**



Setting the scale display

✔ Settings at power-on

The ON/OFF setting of the scale remains when the power is turned off. If the power is turned off with the scale being displayed, it appears automatically when turning the power on again.

✔ Display size setting

When the number out of the display range is set for the display size, the scale shows the 10x, 100x, ... , or 1/10, 1/100, ... of the length of the display size.

4.7 Setting Image Capture Conditions

Set the basic image capture conditions. The procedures to set the following from the [EASY MENU] are described here.

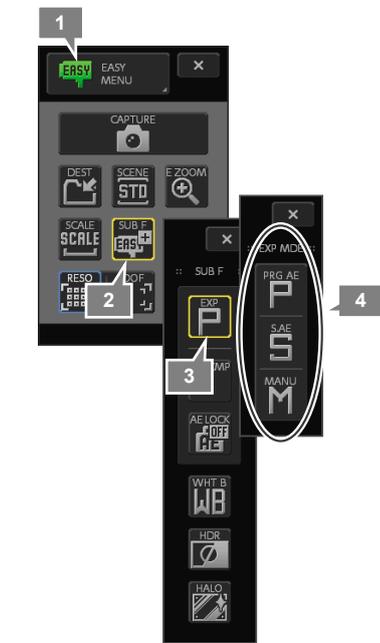
- Exposure Mode Switching
- Exposure Compensation
- AE Lock
- White Balance

4.7.1 Exposure Mode Switching

This system provides three exposure modes: the Program AE mode, the Shutter-priority AE mode, and the Manual mode. Switch the exposure mode as required.

✔ Exposure mode of the scene mode
The exposure mode set for each scene mode is “Program AE.”

- 1 Open the [EASY MENU].**
- 2 Press the [SUB F] button.**
The [SUB F] submenu appears.
- 3 Press the [EXP] button.**
The [EXP MDE] submenu appears.
- 4 Select an exposure mode from the [EXP MDE] submenu.**
 - **[PRG AE]**
Program AE mode. In this mode, the shutter speed and the camera gain are set automatically.
 - **[S.AE]**
Shutter-priority AE mode. In this mode, set the shutter speed manually. The camera gain is automatically set.
 - **[MANU]**
Manual mode. In this mode, set both the shutter speed and the camera gain manually.



Switching the exposure mode

After an exposure mode is selected, the [EXP MDE] submenu and the [SUB F] submenu close.

- 5** When the Shutter-priority AE mode or the Manual mode is selected, press the [SUB F] button to set the shutter speed and the camera gain (only for the Manual mode).

The content of the [SUB F] submenu changes in accordance with the selection of the exposure mode.

- **Shutter speed setting (for the Shutter-priority AE and Manual modes)**

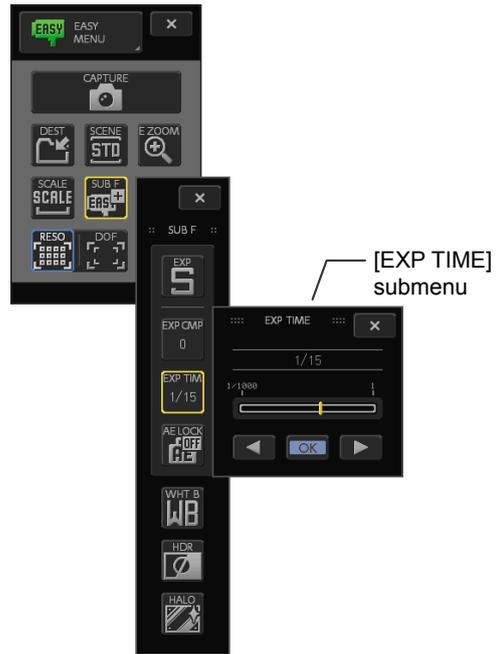
Press the [EXP TIM] button in the [SUB F] submenu. Set a time value in the [EXP TIME] submenu.

- **Camera gain setting (for the Manual mode only)**

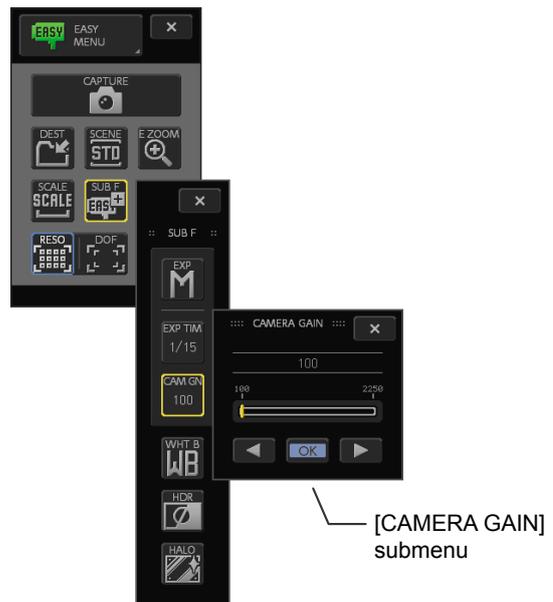
Press the [CAM GN] button in the [SUB F] submenu. Set a value in the [CAMERA GAIN] submenu.

Set a value and press the [OK] button to close the submenu. To change the setting, start the procedure from pressing the [SUB F] button again.

■ **Shutter speed setting (for the Shutter-priority AE mode)**



■ **Camera gain setting (for the Manual mode)**



Setting the shutter speed and the camera gain

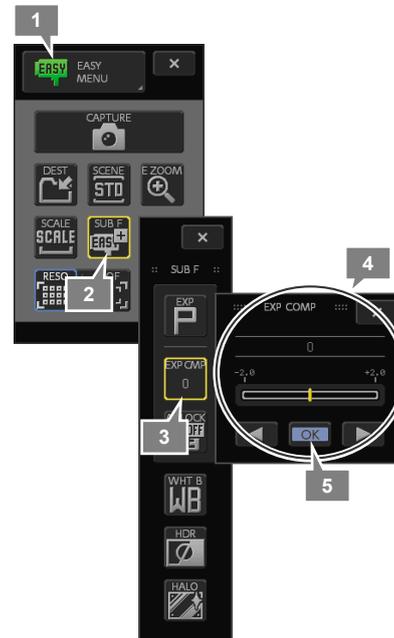
✔ **Settings at power-on**

The selected exposure mode is saved when the power is turned off. The saved exposure mode is applied when the power is turned on again.

4.7.2 Exposure Compensation

Exposure compensation is a function that changes the automatic exposure value calculated by the system and adjusts the brightness of the entire screen. The exposure compensation is available only in the Program AE and Shutter-priority AE modes.

- 1 Open the [EASY MENU].**
- 2 Press the [SUB F] button.**
The [SUB F] submenu appears.
Check that the [EXP] button icon is “P” (the Program AE mode) or “S” (the Shutter-priority AE mode).
- 3 Press the [EXP CMP] button.**
The [EXP COMP] submenu appears.
- 4 Set a value in the [EXP COMP] submenu to adjust the exposure compensation.**
Adjust the value while checking exposure with the live image.
The compensation range is ± 2.0 and the step is $1/3$.
- 5 Press the [OK] button to complete the setting.**
Pressing the [OK] button closes the submenu. To change the setting, start the procedure from pressing the [SUB F] button again.



Exposure compensation setting

✔ Settings at power-on

The setting of exposure compensation is saved when the power is turned off. The saved exposure compensation value is applied when the power is turned on again.

4.7.3 AE Lock

The AE lock is used to fix (or lock) the automatically calculated exposure value when the exposure mode is “Program AE” or “Shutter-priority AE.” Use this function when observing the specimen with a fixed exposure or when the brightness of the part for which the exposure is to be adjusted is significantly different from the other parts.

1 Open the [EASY MENU].

2 Press the [SUB F] button.

The [SUB F] submenu appears.

Check that the [EXP] button icon is “P” (the Program AE mode) or “S” (the Shutter-priority AE mode).

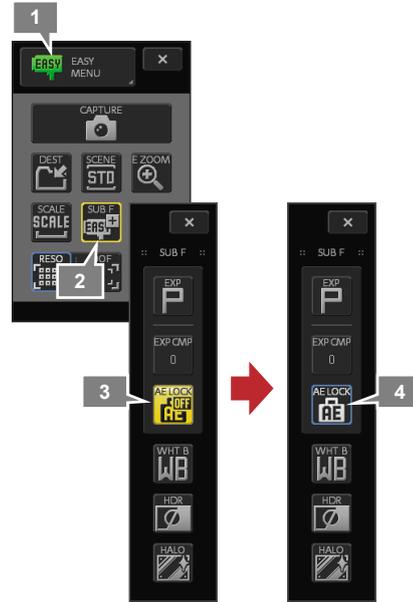
3 Press the [AE LOCK] button.

The automatic exposure value is locked when the button is pressed, and the [SUB F] submenu closes.

When the AE lock is on, a blue frame appears around the [AE LOCK] button in the [SUB F] submenu.

4 To release the AE lock, press the [AE LOCK] button again in the [SUB F] submenu.

The AE lock is released and the [SUB F] submenu closes.



Operating the AE lock

✔ Settings at power-on

The AE lock state is reset when the power is turned off.

4.7.4 White Balance

White balance is the process of correcting color bias due to difference of the light source and adjusting the color of white so that white objects appear really white in the photograph. In this system, the white balance can be set manually.

1 Place a sheet of white paper or the like on the stage so that it fills the entire live image area.

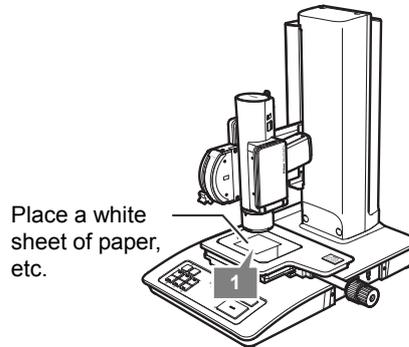
2 Open the [EASY MENU].

3 Press the [SUB F] button.

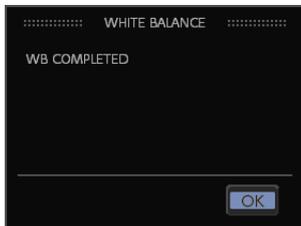
The [SUB F] submenu appears.

4 Press the [WHT B] button.

The white balance is set and the [SUB F] submenu closes.



Preparing an object

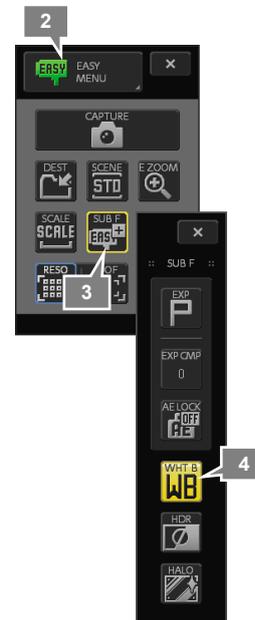


White Balance Setting Completed

5 Press the [OK] button to close the confirmation message.

Check the setting with the live image.

6 Remove the white paper placed in step 1 from the stage.



Setting the white balance

✔ Settings at power-on

The setting of white balance is saved when the power is turned off. The white balance setting is applied when the power is turned on again.

4.8 Capturing an Image

Capture the image displayed on the touch panel monitor and save it in the specified destination folder as an image file.

❗ Confirmation of the basic settings

Before capturing an image, confirm the following settings.

- **Save folder selection**
(See “4.2 Specifying the Destination to Save Images” or “5.4.2 Specifying a save folder.”)
- **Image quality mode (file type) selection**
(See “5.4.2 Selecting an image quality mode (file type).”)
- **Image storage size selection**
(See “5.4.2 Selecting a size of the image to be saved.”)

❗ Precautions for saving images

While an image is being saved, do not remove the recording medium or network cable. Doing so may cause improper image recording or damage to this system or to the recording medium.

✔ Names of image files

Whether image files are named automatically or manually in capturing can be set when an image is captured using the [EASY MENU].

Set the file naming selection and file naming convention in the [SETUP MENU: FILE]. For details, see “8.4.2 Configuring File Naming System and Convention.”

✔ Capture sound

A capture sound is emitted when an image is captured. To change sound volume, see “8.5.5 Configuring Other Settings.”

✔ Using the annotation function and the simplified measurement function

When pen drawing, text annotation, or distance or angle measurement is performed, the results can be embedded in the image to be saved.

See “7 Using Annotation and Simplified Measurement” for details about the annotation function and simplified measurement function.

4.8.1 Capturing a Live Image

Capture the live image observed on the touch panel monitor by operating the [EASY MENU].

1 Check the live image.

Check that the object is displayed at the proper brightness and with focus on the desired part.

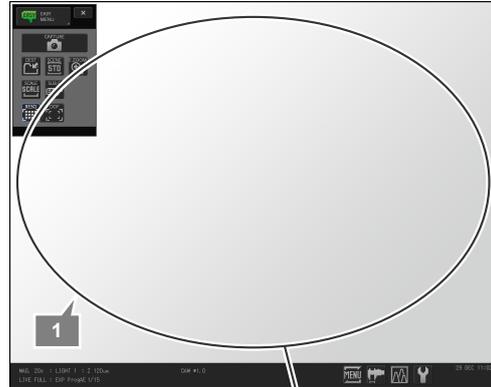
2 Press the [CAPTURE] button in the [EASY MENU].

The image is captured in accordance with the settings and the image file is saved in the specified destination folder.

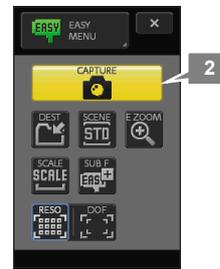
Note: When an image file is set to be named manually in capturing, pressing the [CAPTURE] button displays the [SAVE AS] window. For details on the procedure for using this function, see “Naming and saving an image when captured” described below.

A capture sound is emitted when an image is captured. While the image is being saved, the pointer shape changes and the “Saved..1/1” message appears on the status bar.

After the image is saved, the system returns to the operable state.



Checking the live image



Capturing the live image

✓ Naming and saving an image when captured

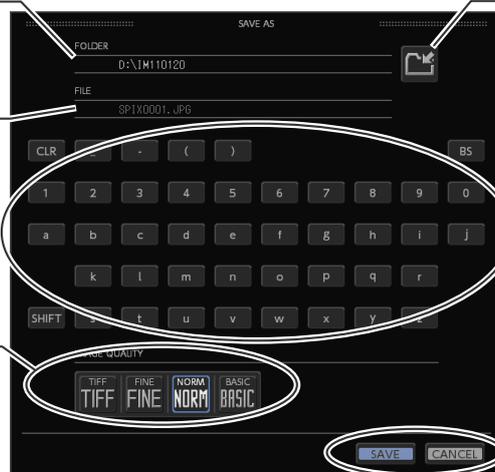
When the [SAVE AS] checkbox in the [FILE NAME] area in the [SETUP MENU: FILE] window is selected, pressing the [CAPTURE] button displays the current image as a still image and the [SAVE AS] window on the screen.

Check the destination folder, image file name and image quality setting, and change the setting as required. Pressing the [SAVE] button closes the [SAVE AS] window and saves the image in accordance with the setting you have made.

[FOLDER] field
Displays the folder set as the destination folder of the image to be saved.

[FILE] field
Displays the initial file name automatically set. To change the file name, enter a new file name (max. of 26 letters) using the keypad. A file extension is automatically added to the end of the file name.

[IMAGE QUALITY] buttons
Select the quality of the image to be saved from [TIFF], [FINE], [NORM] and [BASIC]. The file extension changes in accordance with the selection. “.TIF”: when [TIFF] is selected
“.JPG”: when [FINE], [NORM] or [BASIC] is selected.



Naming and saving an image when capturing ([SAVE AS] window)

[Destination] button

Use this button to change the destination folder. Select the drive and folder as a destination and press the [OK] button in the [SAVE FOLDER] window.

Keypad

To change the file name, directly enter the file name from the keypad. To switch to upper-case letters, use [SHIFT], to delete one letter, use [BS] and to delete the entry, use [CLR].

[SAVE] / [CANCEL] button

To save the image, press the [SAVE] button, and to discard the image, press the [CANCEL] button.

Note: If the [SAVE MEDIA] checkbox in the [SETUP MENU: ADDITIONAL] window is not selected, the destination folder cannot be specified. For details on the procedure for changing the setting, see “8.5.2 Configuring Capture Function.”

4.8.2 Performing Interval Shooting

When [CONT] is selected as the shot mode, execution of the interval shooting can be controlled using the [CAPTURE] button in the [EASY MENU].

✔ Continuous shot mode setting

See “5.4.2 Setting the shot mode” for details about continuous shot mode setting.

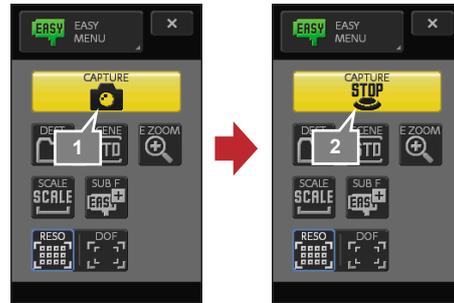
1 To start the interval shooting, press the [CAPTURE] button in the [EASY MENU].

The first shot of the interval shooting is captured and the icon of the [CAPTURE] button changes to “STOP.”

The second and subsequent shots are captured automatically at the specified interval until the specified number of shots is captured.

When the specified number of images has been captured, the interval shooting terminates automatically.

2 To stop the interval shooting halfway, press the [CAPTURE] button again.



Start and stop of interval shooting

✔ Names of image files

In interval shooting, image files are automatically named in accordance with the setting in the [SETUP MENU: FILE] window, regardless of the setting of the [SAVE AS] checkbox.

✔ Image capture condition change during interval shooting

This system allows you to change the image capture conditions from the motorized stand or the operation menu while the interval shooting is in progress.

- The exposure or focus position can be changed during interval shooting to capture the changes of the object’s appearance.
- If it is necessary to capture the object under a fixed condition to observe time variation of the object, etc., do not change the condition during interval shooting.

✔ Restrictions for interval shooting

- EDF, HDR and halation elimination operations cannot be performed during interval shooting.
- Images for interval shooting cannot be output to a printer. The setting of [CAPTURE FUNC] - [PRINT] in the [SETUP MENU: ADDITIONAL] window is disabled during interval shooting.

4.8.3 Capturing HDR images

The HDR (High Dynamic Range) image is an image created by combining multiple images of an object captured at various exposures to reduce or enhance the difference between light and dark (dynamic range).

In a normal shot, a large difference between light and dark on the object may cause white-out or black-out in some parts. Also parts with almost no difference may be displayed homogeneously. The HDR process adjusts the light-dark difference to display details of such parts.

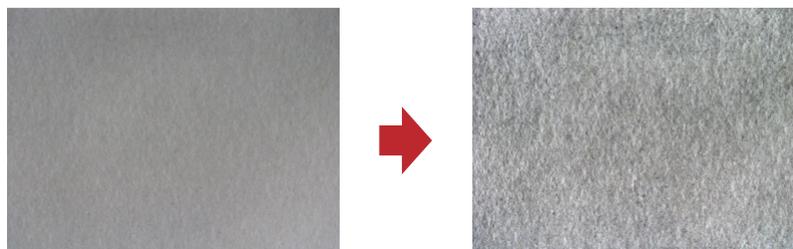


Figure Example of HDR Image

❗ Image size of the HDR image

If the storage size and the display size of the image are set to [FULL] (2M) and 800x600 (0.5M), respectively, when an HDR image is captured, the display size will automatically change to 1280x960.

✔ Brightness and hue variation and uneven brightness of the HDR image

The contrast is enhanced in HDR capturing. Depending on the object or capturing conditions, the captured image may be affected as follows:

- The brightness and hue may differ from the actual image.
- Uneven brightness may occur.

To capture an HDR image from the [EASY MENU], perform the following procedure.

- 1 Place the specimen (object) on the stage.**
- 2 Check the live image and make adjustment to obtain a proper view of the object.**

Adjust the illumination and zoom magnification and focus the camera on the desired part.

Note: Set image capture conditions such as a scene mode and white balance.

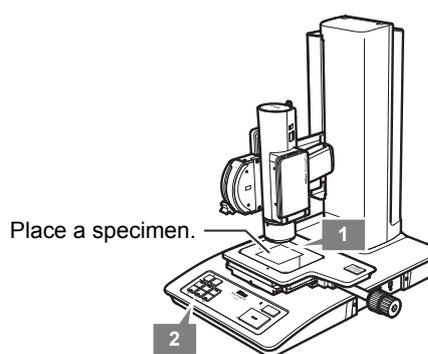
- 3 Open the [SUB F] submenu in the [EASY MENU] and press the [HDR] button.**

The [HDR] submenu appears and the HDR-composed still image is displayed.

The [X] button for closing the still image appears at the upper right corner of the screen.

Note: Operations such as changing the scene mode, etc. are restricted while the HDR image is displayed.

- 4 Adjust the appearance of still images in the [HDR] submenu.**



Preparing an object

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Operating the EASY Menu

- **[FULL] checkbox**
Switch the FULL mode between on and off. With this mode on, the HDR is adjusted so that all the range from low to high brightness area of the object is displayed.
- **[TEXTURE] button**
Apply texture enhancement effect.
 - **[REVERSE]:** Apply the reverse effect of the texture enhancement so that the texture is not easily noticed.
 - **[NONE]:** Turn off the texture enhancement effect.
 - **[WEAK]:** Apply relatively weak texture enhancement effect.
 - **[STRONG]:** Apply relatively strong texture enhancement effect.
- **[GAIN] slider/adjustment button**
Apply gain to the image to narrow the dynamic range.
- **[OFFSET] slider/adjustment button**
Adjust the brightness of the image without changing the dynamic range.
- **[CHROMA] slider/adjustment button**
Adjust the saturation of the HDR image.

Note: When the settings are changed, the HDR image is updated.

5 Check the HDR image state and repeat step 4 until the desired image is obtained.

6 To save an intermediate HDR image file, press the [INT.FILE] button.

The intermediate file is saved in the save folder with an extension of “.HDR.”

Note: If an intermediate file is saved, the HDR composition can be re-executed in the Playback mode. See “5.5.4 Performing the HDR composition using the intermediate file” for details.

7 To save the HDR image, press the [CAPT] button.

The [HDR] submenu closes.

8 Press the [OK] button to close the [HDR] menu.

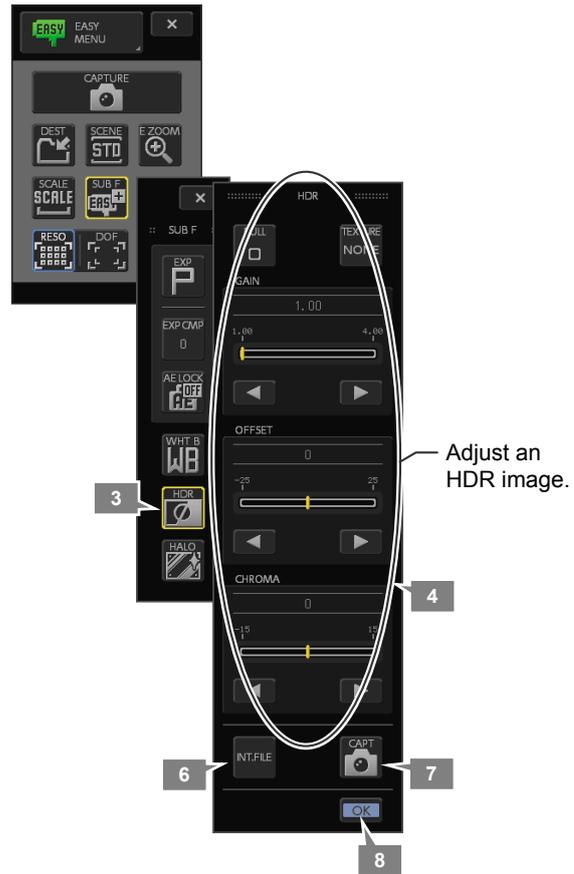
The HDR image remains on the screen.

Note: Pressing the [CAPTURE] button in the [EASY MENU] in this state saves the HDR image.

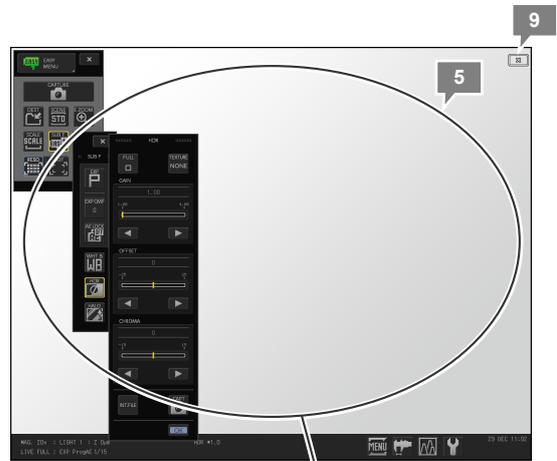
9 To close the still image, press the [X] button at the upper right corner of the window.

A confirmation message is displayed. Press [OK] to close the HDR image.

The live image returns. The display in the middle of the status bar returns from “HDR” to “CAM.”



Capturing, adjusting, and saving an HDR image



Checking the HDR image



Confirmation message

✔ Setting file names

When image files are set to be named manually in capturing, pressing the [CAPT] button or the [INT. FILE] button in the [HDR] submenu displays the [SAVE AS] window. Set the destination folder, file name and image quality (in case of the HDR image), and then press the [SAVE] button to save the file.

4.8.4 Eliminating Halation

This system enables you to capture a halation-free image with a simple operation.

Halation elimination is a process to suppress the brightness of extremely-luminous parts by composing an image from multiple shots of an object captured at various exposures similarly to the case of HDR image process. Use this process when capturing a highly reflective object such as a metal or circuit board to lower the brightness of the part which may cause while-out with a normal capturing. The other parts can be captured with a proper exposure.

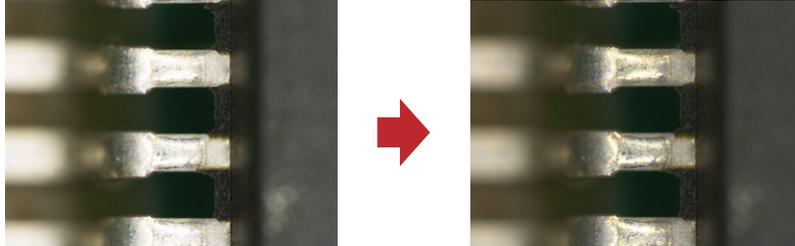


Figure Example of Halation Elimination

✔ Live image of the halation-free image

Elimination of halation is performed with the live image. Because the live image is composed of several frames, the image update speed (frame rate) is slow.

To capture the halation-free image from the [EASY MENU], perform the following procedure.

- 1 Place the specimen (object) on the stage.**
- 2 Check the live image and make adjustment to obtain a proper view of the object.**

Adjust the illumination and zoom magnification and focus the camera on the desired part.

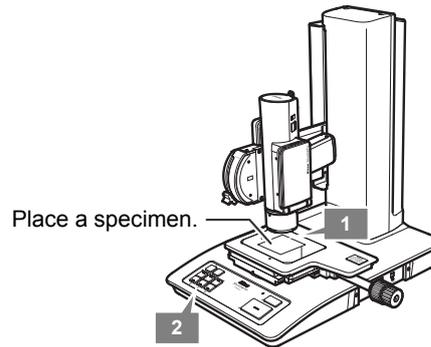
Set image capture conditions such as a scene mode and white balance.

- 3 Press the [HALO] button in the [SUB F] submenu in the [EASY MENU].**

The halation-free live image is displayed.

While the halation-free image is displayed, a blue frame appears around the [HALO] button.

Note: While the halation-free image is displayed, the scene mode and the exposure settings are temporarily disabled.



Place a specimen.

Preparing an object



Starting halation elimination

- 4 To capture the halation-free image, press the [CAPTURE] button.**

Note that the image cannot be saved until the [CAPTURE] button is pressed.

- 5 To finish the halation elimination process, open the [SUB F] submenu and press the [HALO] button.**

The normal live image returns and the blue frame around the [HALO] button disappears.



Saving the halation-free image



Finishing the halation elimination

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Operating the EASY Menu

✔ Names of image files

When image files are set to be named manually in capturing, pressing the [CAPTURE] button displays the [SAVE AS] window. Set the destination folder, file name and quality of the image to be saved, and then press the [SAVE] button to save the file.

5

Operating the MAIN Menu

This chapter describes the procedures for observing and capturing images under your desired conditions using the [MAIN MENU].

5.1 Operating the MAIN Menu

Displaying the [MAIN MENU]

- 1 Press the [MENU] button on the status bar.

The operation menu appears at the upper left (or right) corner.



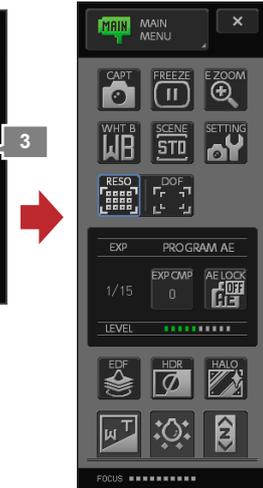
- 2 Press the [MENU SELECT] button on the operation menu.

The [MENU] submenu appears.



- 3 Press the [MAIN] button.

The name of the operation menu changes to the [MAIN MENU].



MAIN MENU

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Operating the MAIN Menu

Items in the [MAIN MENU]

[MENU SELECT] button
The name of the current menu is shown. Display the submenu, allowing you to switch between menus.

[X] (close) button
Close the menu.

[CAPT] button
Capture the live or still image shown on the screen and save it in the specified folder.

[FREEZE] button
Freeze the live image to obtain a still image. Use this button to obtain a still image before capturing or to capture an HDR image.

[E ZOOM] button
Magnify the image. This button enables you to change the magnification and position to display.

[WHT B] button
Set the white balance.

[SCENE] button
Select a scene mode or custom mode.

[SETTING] button
Set the detailed conditions for image capturing. Two types of setting screens, [EXP & COLOR SETTING] and [SHOT & SAVE SETTING], are provided.

[RESO] / [DOF] button
Switch the aperture setting between "Resolution-priority" and "DOF priority".

[EXPOSURE INFORMATION] area
This area shows the information related to exposure. Depending on the selected exposure mode, the [EXP CMP], [AE LOCK], [EXP TIM], or [CAM GN] button is displayed.

[SPECIAL CAPTURE] buttons
Use the [EDF], [HDR] and [HALO] buttons for capturing an EDF, HDR, and halation-free images, respectively.

[DEVICE OPERATION] buttons
Use the [ZOOM], [LIGHT] and [Z POSITION] buttons to set the optical zoom magnification, change the light area of the ring illumination and adjust the illumination, and move the arm of the motorized stand vertically, respectively.

[FOCUS] indicator
The focus indicator of the contrast detection method

MAIN Menu

5.2 Operating the Motorized Stand and the P-400Rv/P-400R from the MAIN Menu

This section describes how to operate the motorized stand and the P-400Rv/P-400R using the [DEVICE OPERATION] buttons in the [MAIN MENU].

- (1) **Adjusting the illumination**
Adjust the light area and brightness of the ring illuminator in the P-400Rv/P-400R.
- (2) **Adjusting the zoom**
Adjust the optical zoom magnification in the P-400Rv/P-400R.
- (3) **Focusing the camera using the arm position**
Focus on the sample by moving the arm of the motorized stand vertically.

✔ Display of the [DEVICE OPERATION] buttons

The [DEVICE OPERATION] buttons in the [MAIN MENU] can be switched to be displayed or not in the [SETUP MENU: MAIN] window.

Display the [DEVICE OPERATION] buttons to adjust the zoom, light or focus in the [MAIN MENU]. Hide these buttons when adjusting the zoom, light or focus on the operation panel of the motorized stand only. The display size of the main menu can be reduced.

See “8.2.1 Customizing the [MAIN MENU] display” for details on how to perform settings.

[DEVICE OPERATION] buttons
in the [MAIN MENU]

5.2.1 Adjusting the Illumination

The ring illumination using eight white LEDs is attached around the objective of the P-400Rv/P-400R. From the touch panel, adjust the light area and brightness.

- 1 Press the [LIGHT] button in the [MAIN MENU].**

The [LIGHT] tab appears.

- 2 Press the [LIGHT AREA] button.**

The [AREA] submenu appears.

- 3 Press a desired button to switch the light area.**

When an area button is pressed, the light area is switched and the submenu closes. Switch the light area while checking the illumination state with the live image.

- 4 Press the [OK] button to determine the light area.**

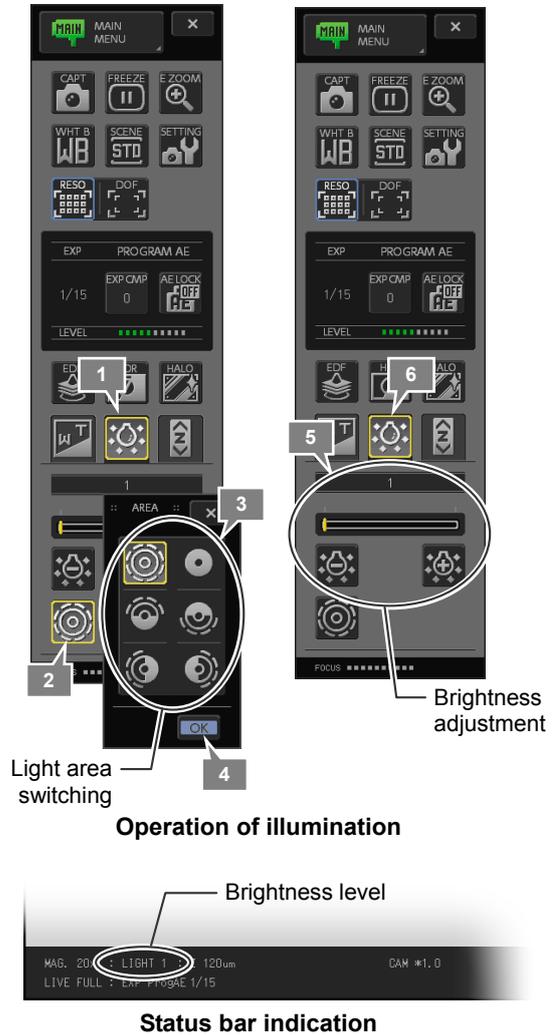
The submenu closes.

- 5 Use the [LIGHT CONTROL] slider or the [+] and [-] buttons to adjust the brightness.**

The brightness can be adjusted in a range of Level 1 to Level 10.

The current brightness level is indicated both on the [LIGHT] tab and the status bar.

- 6 Press the [LIGHT] button to close the [LIGHT] tab.**



✔ Illumination in the Hi-reflection sample mode

The brightness is fixed to 10 when Hi-reflection Sample is selected as the scene mode. In this state, the [LIGHT CONTROL] slider and the [+] and [-] buttons in the [MAIN MENU] are grayed out and cannot be used.

✔ Settings at power-on

The illumination setting is saved when the power to the motorized stand is turned off, and the saved setting will be applied next time the power is turned on. Because strong light may be emitted depending on the saved setting, do not look at the light source directly.

✔ Operating the motorized stand

The illumination can be adjusted also from the operation panel of the motorized stand. See “3.4 Adjusting the Illumination” for details.

⚠ Illumination for observing a specimen with a polished surface

When observing an object with a high reflection ratio, such as a specimen with a polished surface, under low magnification, if the ring illuminator is used in the P-400Rv/P-400R, an LED image may be reflected. In this case, use another illuminator.

5.2.2 Adjusting the Zoom

The camera head contains a 20x optical zoom lens. From the touch panel, adjust the zoom magnification.

- 1 Check the position of the specimen with the live image.
- 2 Press the [ZOOM] button in the [MAIN MENU].
The [ZOOM] tab appears.
- 3 Use the [W] or [T] button or the slider on the [ZOOM] tab to adjust the zoom magnification.

The zoom magnification is indicated in the [ZOOM] tab.

- **Zoom magnification**
1, 1.2, 1.5, 1.8, 2, 2.5, 3, 4, 5, 6, 8, 10, 12, 15, 18, 20 (16 levels)

Note: The magnification of the live image is indicated on the status bar.

- 4 Press the [ZOOM] button again to close the [ZOOM] tab.



Changing the zoom magnification



Status bar indication

✔ Magnification display on the screen

When the display size is 1280x960, the magnification of the image displayed on the touch panel monitor is 20x of the optical zoom magnification. It is 20x when the zoom magnification is 1x and 400x when the zoom magnification is 20x.

Note: The magnification of the electronic zoom is not included in the display magnification.

✔ Settings at power-on

The zoom magnification is reset when the power is turned off. The zoom magnification is 1x when the power is turned on again.

✔ Operating the motorized stand

The zoom can be changed also from the operation panel of the motorized stand. See “3.5 Operating the Zoom” for details.

Operating the electronic zoom

The [E ZOOM] button is used to magnify a live image or playback image.

When the [E ZOOM] button is pressed, the corresponding submenu appears, which provides the magnifying glass icon buttons to increase or decrease the magnification, the [C] button to clear the magnification setting, and the arrow buttons to change the display position.

The electronic zoom is a function that enlarges a part of the actual image. The higher the magnification ratio is, the poorer the quality of the image becomes. An image cannot be reduced to less than the actual size.

Note: The magnification of the electronic zoom is indicated in the middle of the status bar.



Operating electronic zoom

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Operating the MAIN Menu

✔ Operating the electronic zoom

- The [E ZOOM] button is included in every operation menu ([EASY], [MAIN], [VIEW], and [TOOL]).
- The electronic zoom feature is only effective for the screen display. Even though the image enlarged using the electric zoom is captured, the zoom cannot be applied to the saved image.

5.2.3 Focusing the Camera

Move the P-400Rv/P-400R vertically so that the camera can focus on the specimen. From the touch panel, adjust the vertical position of the camera head.

⚠ CAUTION – Never use the contact observation adapter.
 Before using the P-400Rv/P-400R mounted on the motorized stand, be sure to remove the contact observation adapter. If the arm with the contact observation adapter attached is moved, the contact observation adapter may collide with the specimen or stage and be broken. This may cause damage to the adapter or malfunction of the elevating section of the system.

✔ Focus position

The focus position of the P-400Rv/P-400R is 29 mm off the end of the lens.

1 Check the position of the specimen with the live image.

2 Press the [Z POSITION] button in the [MAIN MENU].

The [Z POSITION] tab appears at the bottom of the [MAIN MENU].

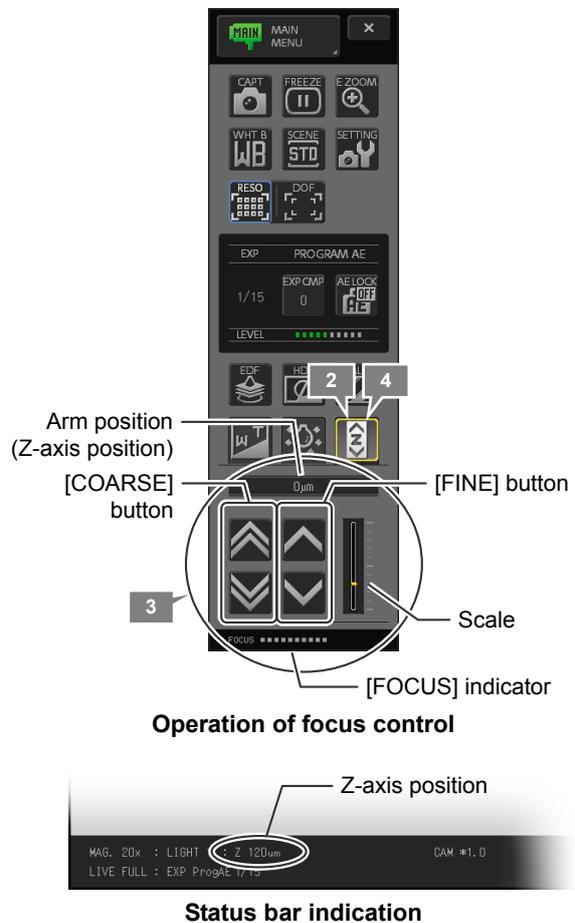
3 Use the [COARSE] or [FINE] button to adjust the vertical position of the P-400Rv/P-400R.

The movement speed is between 0.8 and 10 mm/sec. for coarse movement and between 0.08 and 5 mm/sec. for fine movement (It varies depending on the zoom magnification.). Adjust the focus of the camera while checking the live image.

When the initialization of the arm has completed, the current arm position (Z-axis position) is indicated by the scale on the [Z POSITION] tab.

The arm position is indicated on the [Z POSITION] tab and the status bar in units of μm . If the arm is at the uppermost or lowermost position, "LIMIT" is displayed on the [Z POSITION] tab.

4 Press the [Z POSITION] button again to close the [Z POSITION] tab.



✔ Display of the arm position

- When the arm position is initialized, the in-focus position of the upper surface of the 3x2 stage (and sliding stage) is treated as zero and the current Z position in relation to the zero position is displayed. Note that due to product variation, the current position may not be displayed as zero even when the upper surface of the stage is in focus.
- If no initialization is set to be performed, the arm position at the time the power is turned on is used as the zero position.

✔ Operating the motorized stand

The arm of the P-400Rv/P-400R can be moved vertically also from the operation panel of the motorized stand. See "3.6 Focusing the Camera" for details.

Checking the focus using the [FOCUS] indicator

There is a 10-level focus indicator on the upper part of the LCD monitor which lights depending on the current focus level. This indicator can be used as a focus assist.

✔ Focus indicator

This system adopts the contrast detection method for focus detection. Thereby, the focus indicator lights when the contrast of the object becomes higher.

- There may be a difference between the actual focus state of the image and the focus indicator state.
- In case of the following objects, the focus indicator shows a lower level even though they are brought to focus.
 - Low-contrast objects
 - Objects with regular vertical stripes

5.3 Setting Basic Conditions for Image Capturing

Change the following settings to prepare for basic image capturing.

- (1) **Selecting a scene mode**
Select a scene mode in accordance with the object.
- (2) **Switching the aperture setting**
Switch the aperture setting in accordance with the object or zoom magnification.
- (3) **Setting the white balance**
Prepare a homogeneously white object for setting the white balance.
- (4) **Adjusting the exposure**
Compensate the exposure to adjust the brightness while checking the live image.

5.3.1 Selecting a Scene Mode

For typical specimens, several image capture conditions are provided as “scene modes.” Selecting a scene mode enables you to capture images with the settings suitable to the specimen. Select a scene mode in accordance with the object.

- 1 **Press the [SCENE] button in the [MAIN MENU].**

The [SCENE] submenu appears.

- 2 **Press the corresponding button to select a scene mode (or custom mode).**

Six scene modes and four custom modes are available. The current selection is marked with a blue frame around the corresponding button.

- Standard
- Wafer/IC Chip
- Metal ceramic
- Circuit board
- FPD (Flat Panel Display)
- Hi-reflection (High-reflection sample)
- Custom 1 to 4

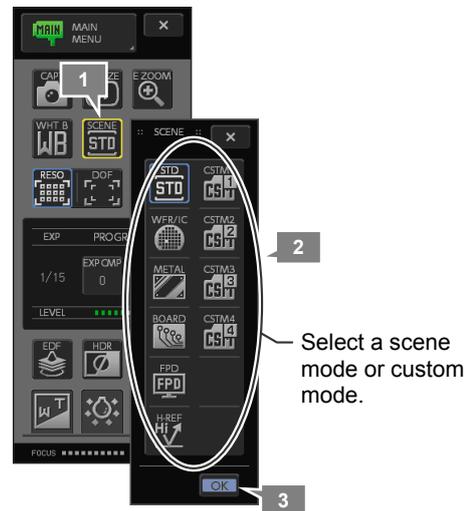
Note: See the next page for details on the Scene mode.

Note: To use custom modes, they must have been registered (see “5.4.1 Using the custom setting”).

- 3 **Press the [OK] button.**

The scene mode selection finishes and the submenu closes. The icon of the [SCENE] button changes in accordance with the selected scene mode.

If the [X] button is pressed to close the submenu, the selection is not applied.



Selecting a scene mode

Button	Scene mode	Description
	Standard	General mode that can be used without detailed settings.
	Wafer / IC chip	Suitable for capturing a silicon wafer or IC chip.
	Metal ceramic	Suitable for capturing a metal specimen. Bright parts are expressed as white, and dark parts are expressed clearly. This mode can also be used for ceramic and plastic specimens.
	Circuit board	Suitable for capturing a circuit board, etc. This mode can reduce white-out in bright parts of the object, such as component leads and solder joints, thereby enabling defects to be detected easily. This mode is also suitable for high-contrast objects such as gears and other metal components.
	FPD (Flat Panel Display)	Suitable for capturing the color filters for flat display devices, such as liquid crystal display and plasma display.
	H-REF (Hi-reflection Sample)	Suitable for capturing a highly reflective sample. The correct exposure can be obtained, even for a highly reflective sample, by fixing the brightness to 10 and adjusting the shutter speed between 1/20000 of a second and 1 second.

✔ Settings at power-on

The selected scene mode is saved when the power is turned off and the saved scene mode will be applied when the power is turned on again. However, if the custom setting is set to be enabled at the time of startup, the custom mode setting will be applied.

✔ Changing the scene mode setting

- After selecting a scene, the settings such as the exposure mode, exposure compensation, camera gain, and shutter speed can be changed. However, those changes cannot be saved to the scene mode.
- To save an arbitrary setting, use “Custom Setting.” See “5.4.1 Using the custom setting” for details on the procedure for registering a custom setting.

✔ Image flickering during observation

Depending on the observation object, flickering may occur in the live image. (Flickering is noticeable in a homogeneous color sample.) Flickering can be prevented with either of the following methods.

- Change the exposure mode to “Manual” and decrease the shutter speed.
- Increase the illumination intensity.

Note that too slow shutter speed or too strong illumination intensity may cause overexposure. Adjust the shutter speed or illumination intensity to gain a proper exposure while checking the live image.

✔ Exif data

Data stored in the “Scene capture type” tag in Exif is different from those set in the ShuttlePix scene mode.

Using a custom mode

If the custom setting is registered, a setting can be made so that the custom setting is automatically applied at the startup of the system.

See “8.2.1 Calling custom settings on startup” for details.

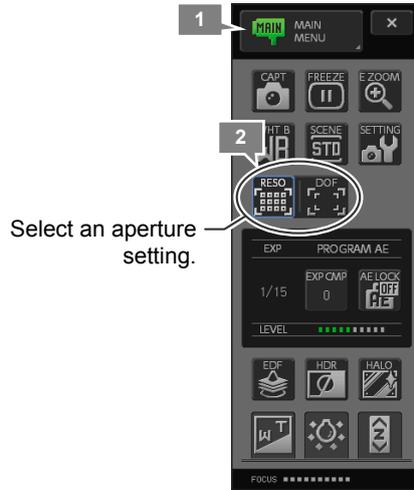
5.3.2 Switching the Aperture Setting

The aperture setting for capturing can be switched between “Resolution-priority” and “DOF-priority.”

- 1 Display the [MAIN MENU].
- 2 Press the [RESO] or [DOF] button to select an aperture.

- **Resolution-priority**
Select the [RESO] button.
- **DOF-priority**
Select the [DOF] button.

The current selection is marked with a blue frame around the corresponding button.



Selecting the aperture

Button	Aperture setting	Description
	Resolution priority	The resolution becomes high and the depth of field (focus range) becomes shallow.
	DOF priority	The resolution becomes low and the depth of field (focus range) becomes deep.

✔ Settings at power-on

The aperture setting is reset when the power is turned off. The “Resolution-priority” will be automatically selected when the power is turned on again.

✔ Aperture setting and user shading compensation

Correct shading using either of the two types of settings: [STD] and [USER], in order to correct unevenness of sensitivity due to decrease in brightness towards the corners of the screen. (See “5.4.1 Correcting shading” for details.)

When using the [USER] setting (user shading compensation value), switching the aperture setting from the state in which the compensation value was set changes the shading state resulting in improper shading correction. In this case, measure the shading and set the compensation value again.

Note: A compensation value for the P-400Rv/P-400R ring illuminator for the aperture of “Resolution-priority” is set in the [STD] setting (standard shading compensation value).

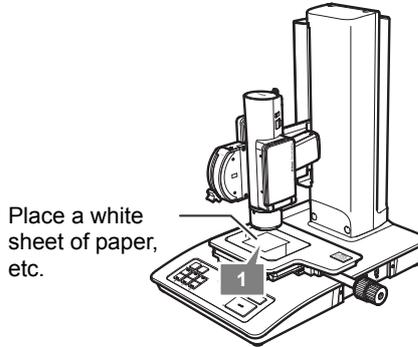
5.3.3 Setting the White Balance

White balance is the process of correcting color bias due to difference of the light source and adjusting the color of white so that white objects appear really white in the photograph. This system allows you to adjust the white balance manually.

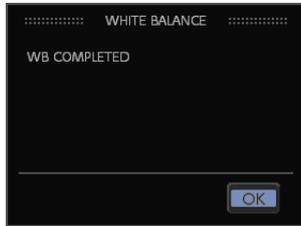
- 1 Place a white object such as a sheet of white paper on the stage so that it fills the entire metering area.**
- 2 Adjust the light to set the illumination state for observation/capturing.**
- 3 Press the [WHT B] button in the [MAIN MENU].**

The white balance is obtained from the view of the object when the button is pressed.

When the white balance is set, a confirmation message appears.



Preparing an object



White Balance Setting Completed

- 4 Press the [OK] button to close the confirmation message.**

Check the setting by referring to the live image.

- 5 Remove the white object placed in step 1.**



Setting white balance

✔ White balance measuring area

The area used to obtain the white balance is the same as the metering area. See “5.4.1 Switching the metering area” for details about metering area setting.

✔ White balance setting failure

If the object used for white balance setting is not homogeneously white, the white balance may not be set correctly. In this case, a confirmation message appears. Retry the white balance setting in accordance with the above procedure.

5.3.4 Adjusting the Exposure

Compensate the exposure to adjust the brightness while checking the live image.

✔ Exposure level indication

The [EXP] area of the [MAIN MENU] has the [LEVEL] indicator which shows the exposure level in a range from Level 1 to Level 10.

The indicator light changes in accordance with the exposure state. It lights when the screen becomes bright and goes off when the screen becomes dark. With a proper exposure, the indicator light shows around Level 5.

Use this indicator as a reference when compensating the exposure or set the exposure manually.



Shows the exposure state.

Showing the exposure level

✔ [EXPOSURE INFORMATION] area

The exposure information is displayed in the [EXPOSURE INFORMATION] area in the [MAIN MENU]. Use the buttons in the [EXPOSURE INFORMATION] area to set exposure compensation, AE lock, etc.

The [EXPOSURE INFORMATION] area can be shown or hidden in the [SETUP MENU: MAIN] window.

Hiding the [EXPOSURE INFORMATION] area reduces the display size of the [MAIN MENU].

See “8.2.1 Customizing the [MAIN MENU] display” for details on how to perform settings.



Area not shown

[EXPOSURE INFORMATION] area

[EXPOSURE INFORMATION] area in the [MAIN MENU]

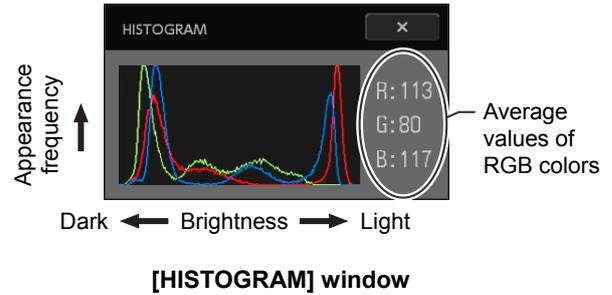
(1) Showing histograms

When the [HISTOGRAM] button is pressed on the status bar, the [HISTOGRAM] window appears at the right bottom of the screen.

In the [HISTOGRAM] window, the system calculates the distribution of brightness of the image and shows it as a histogram.

The histogram indicates distribution of brightness for each RGB color which allows fine adjustment of the exposure level.

- The horizontal axis indicates brightness (dark to light from left to right).
- The vertical axis indicates appearance frequency.
- On the right to the histogram, average values of RGB colors are shown.



✔ Reading and compensating the exposure

When the distribution reaches the right end of the histogram, the bright part of the image is saturated (white-out). When the distribution reaches the left end of the histogram, the dark part of the image is collapsed (black-out).

It is preferred that no white-out and black-out occurs in the entire image, but, in some cases, adjustment is necessary.

If a bright part of the image is important, adjust the distribution to the left. If a dark part is important, adjust the distribution to the right.

By adjusting the distribution in accordance with the important level, it is possible to prevent insufficient gradation during image processing.

(2) Compensating the exposure

The exposure compensation is available to adjust the exposure in the Program AE or Shutter-priority AE mode. Exposure compensation is a function that changes the automatic exposure value calculated by the system and adjusts the brightness of the entire screen.

1 Check that the exposure mode is Program AE or Shutter-priority AE.

The current exposure mode can be checked in the [MAIN MENU] display.

2 Press the [EXP CMP] button in the [MAIN MENU].

The [EXP COMP] submenu appears.

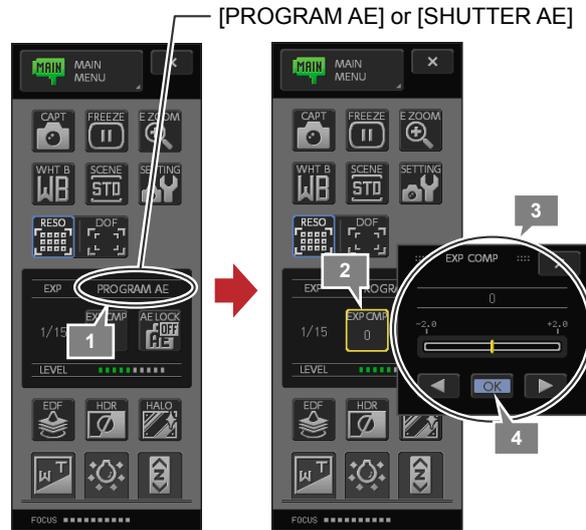
3 Use the slider and button in the [EXP COMP] submenu to adjust the exposure compensation value.

- **Setting range**
±2.0 (1/3 step)

The current value is indicated in the [EXP COMP] submenu. Adjust the value while checking exposure with the live image.

4 Press the [OK] button.

The submenu closes and the exposure compensation value is indicated on the [EXP CMP] button.



Exposure compensation setting

✔ Settings at power-on

The setting of exposure compensation is saved when the power is turned off. The saved exposure compensation value will be applied when the power is turned on again.

(3) Setting the shutter speed

When the exposure mode is Shutter-priority AE or Manual, the shutter speed (exposure time) can be set arbitrarily.

✔ Exposure adjustment and aperture setting

This system uses a combination of the shutter speed and the camera gain to determine the exposure. The aperture is fixed to the resolution-priority or the DOF-priority.

1 Check that the exposure mode is Shutter-priority AE or Manual.

The current exposure mode can be checked in the [MAIN MENU] display.

2 Press the [EXP TIM] button in the [MAIN MENU].

The [EXP TIME] submenu appears.

3 Use the button and slider in the [EXP TIME] submenu to adjust the shutter speed value.

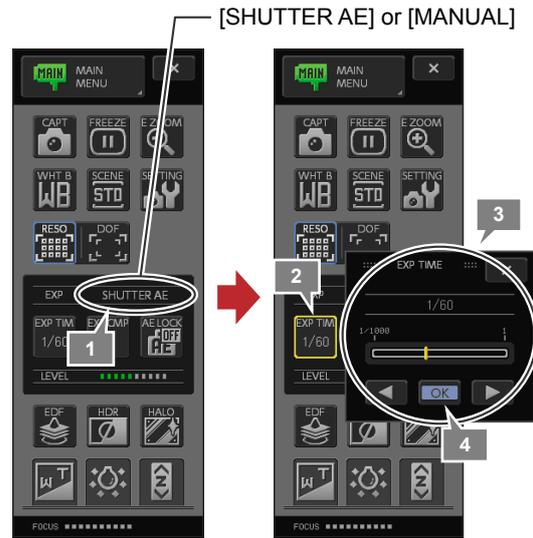
• Setting range

The selectable range contains the following 21 levels: 1/1000 sec., 1/700 sec., 1/500 sec., 1/350 sec., 1/250 sec., 1/180 sec., 1/125 sec., 1/90 sec., 1/60 sec., 1/40 sec., 1/30 sec., 1/20 sec., 1/15 sec., 1/10 sec., 1/8 sec., 1/6 sec., 1/4 sec., 1/3 sec., 1/2 sec., 1/1.5 sec., 1 sec.

The current value is indicated on the submenu. Adjust the value while checking the live image.

4 Press the [OK] button.

The submenu closes and the shutter speed value is indicated on the [EXP TIM] button and the status bar.



Shutter speed setting



Exposure mode and shutter speed

Status bar indication

✔ Shutter speed in Hi-reflection sample mode

When Hi-reflection Sample is selected as the scene mode, the shutter speed range is expanded from 1/20000 of a second to a second. When the exposure mode is switched to “Shutter-priority AE” or “Manual” in this state, the following shutter speeds can be selected:

1/20000, 1/16000, 1/11000, 1/8000, 1/5700, 1/4000, 1/2800, 1/2000, 1/1400, 1/1000, 1/700, 1/500, 1/350, 1/250, 1/180, 1/125, 1/90, 1/60, 1/40, 1/30, 1/20, 1/15, 1/10, 1/8, 1/6, 1/4, 1/3, 1/2, 1/1.5, 1 (Unit: second, 30 levels)

✔ Settings at power-on

The shutter speed setting is saved when the power is turned off. The saved shutter speed will be applied when the power is turned on again.

(4) Setting the camera gain

When the exposure mode is Manual, the exposure can be adjusted arbitrarily by setting the shutter speed and camera gain (sensitivity). The camera gain is used to set the sensitivity of the P-400Rv/P-400R. When a higher value is set for the camera gain, darker objects can be captured. However, higher sensitivity is likely to cause more noises in the image.

☑ Exposure adjustment and aperture setting

This system uses a combination of the shutter speed and the camera gain to determine the exposure. The aperture is fixed to the resolution-priority or the DOF-priority.

1 Check that the exposure mode is Manual.

The current exposure mode can be checked in the [MAIN MENU] display.

2 Press the [CAM GN] button in the [MAIN MENU].

The [CAMERA GAIN] submenu appears.

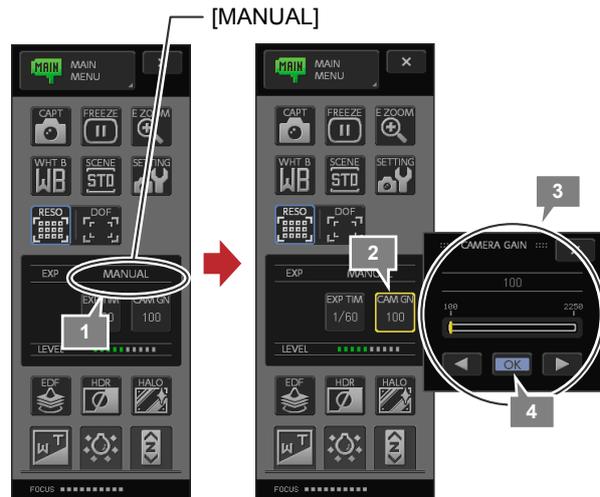
3 Use the button and slider of the [CAMERA GAIN] submenu to adjust the camera gain value.

- **Setting range (factory default: 100)**
100, 140, 200, 280, 400, 560, 800, 1130, 1600, 2250 (10 levels).

The current value is indicated on the submenu. Adjust the value while checking the live image.

4 Press the [OK] button to determine the camera gain value.

The submenu closes and the camera gain value is indicated on the [CAM GN] button.



Camera gain setting

5

Operating the MAIN Menu

☑ Settings at power-on

The setting of camera gain is saved when the power is turned off. The saved camera gain value will be applied when the power is turned on again.

(5) Using the AE lock

When the exposure mode is Program AE or Shutter-priority AE, it is possible to adjust and lock the exposure for a particular part of the object. Use this function when observing the specimen with a fixed exposure or when the brightness of the part for which the exposure is to be adjusted is significantly different from the other parts.

1 Check that the exposure mode is Program AE or Shutter-priority AE.

The current exposure mode can be checked in the [MAIN MENU] display.

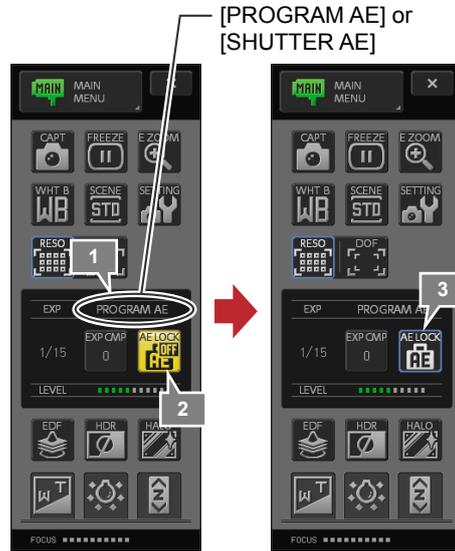
If necessary, change the metering mode and the metering range. See “5.4.1 Exposure & Color ” for details.

2 Press the [AE LOCK] button in the [MAIN MENU] at the position for which you want to lock the exposure.

The current exposure is locked and the [OFF] indication disappears from the [AE LOCK] button icon.

3 To release the AE lock, press the [AE LOCK] button again.

[OFF] appears on the [AE LOCK] button icon.



Operating the AE lock

✔ Automatic release of the AE lock

The AE lock is released when the power is turned off.

5.4 Setting the Detailed Conditions for Image Capturing

This section describes how to set detailed image capture conditions on the [SETTING] button in the [MAIN MENU].

Displaying the [CAMERA SETTING] menu

To display the [CAMERA SETTING] menu, perform the following procedure.

- 1 Press the [SETTING] button in the [MAIN MENU].

The [SETTING] submenu appears.

- 2 Press the [EXP & COLOR] or [SHOT & SAVE] button depending on the item to be set.

- **[EXP & COLOR]**
Pressing this button opens the [EXP & COLOR SETTING] menu. This menu provides buttons to perform settings for live display, exposure control, color adjustment, etc.
See “5.4.1 Exposure & Color Settings” for details about the setting items.

- **[SHOT & SAVE]**
Pressing this button opens the [SHOT & SAVE SETTING] menu. This menu provides buttons to perform settings for capturing and saving images.
See “5.4.2 Shot and Save Settings” for details about the setting items.

The name of the operation menu changes depending on the selected button.

- 3 To return to the [MAIN MENU], press the [MAIN] button at the bottom of the menu.



[EXP & COLOR SETTING] menu

[SHOT & SAVE SETTING] menu

[CAMERA SETTING] menus

5.4.1 Exposure & Color Settings

The [EXP & COLOR SETTING] menu in the [CAMERA SETTING] menus has buttons to perform settings for live image display, exposure control, color adjustment, etc.

[LIVE] button
Switch the live image size between [FULL] and [1/4].

[EXP] button
Select an exposure mode from the following three: [PRG AE], [S.AE], and [MANU].

Image adjustment buttons
Use the [CHRM], [HUE], [CNTRST], [SHARP], [COLOR], and [RB ADJ] buttons to adjust the chroma, hue, contrast, sharpness, color and RB of the image, respectively.

[CSTM] button
The setting for image capturing can be saved as a "custom mode." Each custom mode can include comments.

[SD SEL] button
Select the shading compensation value of the screen from [STD] and [USER].

[X] (close) button
Close the menu.

[MTRG] button
Select the average metering mode ([AVG]) or the peak-hold metering mode ([PEAK]).

[AREA] button
Select a metering range from the following three: [LRG], [CENTER], and [SPOT]. The display of the metering area can be shown/hidden and moved.

[SD SET] button
Set the user shading compensation value.

[← MAIN] button
Return to the [MAIN MENU].

[EXP & COLOR SETTING] menu

Setting items of the [EXP & COLOR SETTING] menu

Button	Content	Ref.
[LIVE] button	Select the display size of the live image from the two options: [FULL] (2M: 1280x960) and [1/4] (0.5M: 800x600).	p.89
[EXP] button	Select the exposure mode from the three options: [PRG AE] (Program AE), [S.AE] (Shutter-priority AE) and [MANU] (Manual).	p.90
[MTRG] button	Select the metering mode for measuring the exposure from the two options: [AVG] and [PEAK].	p.91
[AREA] button	Select the range for measuring the exposure from the three options: [LRG], [CENTER] and [STOP]. The metering area frame can be displayed on the screen. The metering area can also be moved to an arbitrary position.	p.92
Image adjustment buttons	Adjust the chroma, hue, contrast, sharpness, color and RB of the image using [CHRM], [HUE], [CNTRST], [SHARP], [COLOR] and [RB ADJ].	p.95
[CSTM] button	Up to four capture condition settings can be saved as custom settings. A comment can be added to each custom setting.	p.97
[SD SEL] button [SD SET] button	[SD SEL] button: Select the setting for compensating the shading of the image from the two options: [STD] and [USER]. [SD SET] button: Measure the shading and set the user shading compensation value.	p.99

(1) Selecting a display size of the live image

Select a size of the live image from 2 M (1280 x 960) and 0.5 M (800 x 600).

1 Open the [EXP & COLOR SETTING] menu.

Press the [SETTING] button in the [MAIN MENU] and select the [EXP & COLOR] button in the [SETTING] submenu.

2 Press the [LIVE] button.

The [LIVE SIZE] submenu appears.

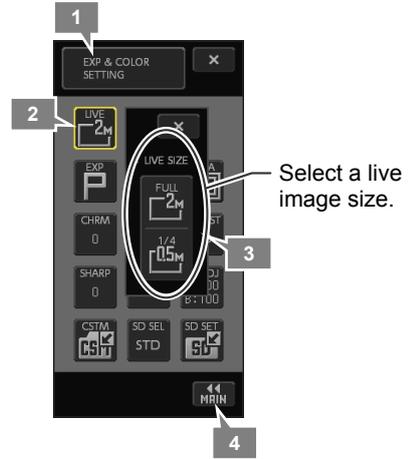
3 Select a live image size.

- **[FULL]**
Displays the live image on the full screen. The image size is 1280 x 960 pixels (2M).
- **[1/4]**
Displays the live image at a quarter-screen size. The image size is 800 x 600 pixels (0.5M).

When either size is selected, the submenu closes and the icon of the [LIVE] button changes accordingly.

4 To return to the [MAIN MENU], press the [← MAIN] button.

Pressing the [X] button closes the [EXP & COLOR SETTING] menu.



Selecting the live image display size

✔ Display size and storage size of an image

This system allows you to set different sizes for the live image size on the touch panel monitor screen and for the storage size to save the image. To change the storage size of the image, see “5.4.2 Selecting a size of the image to be saved.”

✔ Restrictions on display and storage sizes during special capturing

- EDF images are always captured in 800x600 size. When EDF image capturing is started, the display size automatically changes to 800x600.
- If the storage size is set to [FULL] (2M), when an HDR or still (freeze) image is captured, the captured image is displayed in 1280x960 size.
- When a playback image that has been taken by the ShuttlePix (this system or a stand-alone P-400Rv/P-400R) is captured, it is saved with the original image size. If a playback image that has been taken by a device other than ShuttlePix is captured, it is saved in 1280x960 size.

(2) Changing the exposure mode

This system provides three exposure modes: the Program AE mode, the Shutter-priority AE mode, and the Manual mode. Switch the mode as required.

Note: The exposure mode of each scene mode is the Program AE mode.

1 Open the [EXP & COLOR SETTING] menu.

Press the [SETTING] button in the [MAIN MENU] and select the [EXP & COLOR] button in the [SETTING] submenu.

2 Press the [EXP] button.

The [EXP MDE] submenu appears.

3 Select an exposure mode.

- **[PRG AE]**
This mode automatically sets the shutter speed and the camera gain in accordance with the brightness of the object.
- **[S.AE]**
This mode allows you to set the shutter speed manually. The camera gain is automatically set in accordance with the shutter speed.
- **[MANU]**
This mode allows you to set both the shutter speed and the camera gain manually.

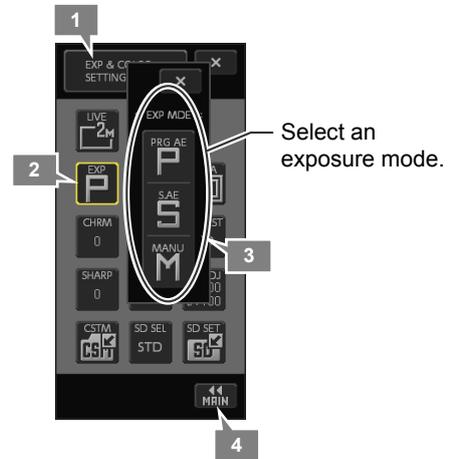
When any of the above is selected, the submenu closes and the icon of the [EXP] button changes accordingly.

4 Press the [◀ MAIN] button to return to the [MAIN MENU].

Pressing the [X] button closes the [EXP & COLOR SETTING] menu.

5 When the Shutter-priority AE mode or the Manual mode is selected, it is necessary to set the shutter speed (the [EXP TIM] button) and/or the camera gain (the [CAM GN] button) in the [MAIN MENU] or the [EASY MENU].

See “5.3.4 Adjusting the Exposure” for details.



Changing the exposure mode

(3) Switching the metering mode

Select a mode to measure the brightness of the object (the metering mode).

1 Open the [EXP & COLOR SETTING] menu.

Press the [SETTING] button in the [MAIN MENU] and select the [EXP & COLOR] button in the [SETTING] submenu.

2 Press the [MTRG] button.

The [MTRG] submenu appears.

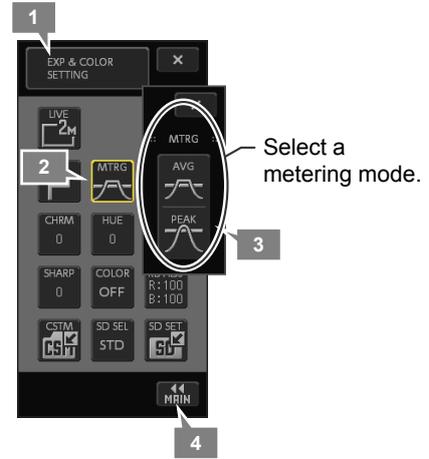
3 Select a metering mode.

- **[AVG]**
This mode adjusts the exposure so that the average of exposure levels can be the same as the specified value.
- **[PEAK]**
This mode adjusts the exposure so that the highest (peak) value of the metering results can be the same as the specified value.

When a metering mode is selected, the submenu closes and the icon of the [MTRG] button changes accordingly.

4 To return to the [MAIN MENU], press the [← MAIN] button.

Pressing the [X] button closes the [EXP & COLOR SETTING] menu.



Switching the metering mode

(4) Switching the metering area

Select the size of the area for metering brightness of the object (metering area) and move the area to an arbitrary position on the screen if necessary.

Switching the metering area size

- 1 Open the [EXP & COLOR SETTING] menu.

Press the [SETTING] button in the [MAIN MENU] and select the [EXP & COLOR] button in the [SETTING] submenu.

- 2 Press the [AREA] button.

The [AREA] submenu appears.

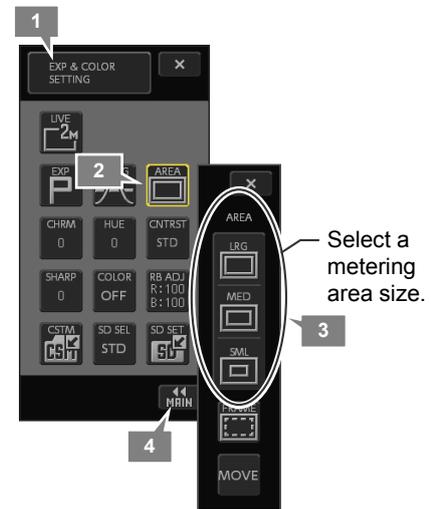
- 3 Select a size of the metering area.

- **[LRG]**
This mode measures the brightness of about 95% of the image size.
- **[MED] (default)**
This mode measures the brightness of about 50% of the image size.
- **[SML]**
This mode measures the brightness of about 20% of the image size.

When a metering area size is selected, the icon of the [AREA] button changes accordingly.

- 4 To return to the [MAIN MENU], press the [← MAIN] button.

Pressing the [X] button closes the [EXP & COLOR SETTING] menu.



Switching the metering area size

Displaying a metering area

Display the frame marking the metering area range. This system can be used normally even though the metering area frame is displayed.

- 1 Open the [EXP & COLOR SETTING] menu.**

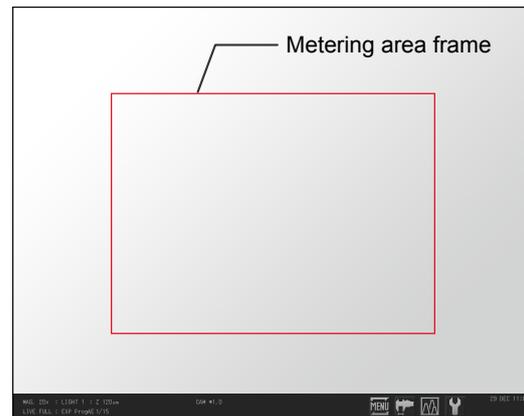
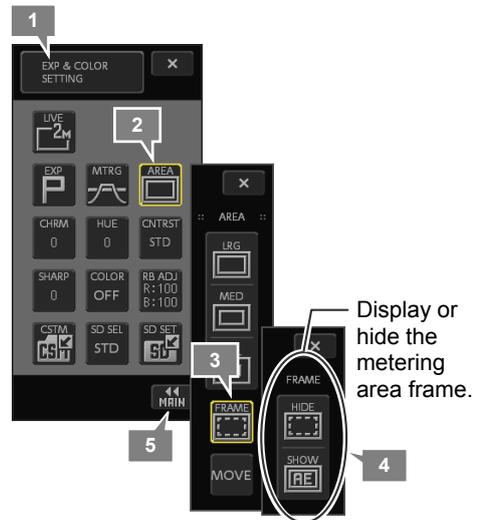
Press the [SETTING] button in the [MAIN MENU] and press the [EXP & COLOR] button in the [SETTING] submenu.
- 2 Press the [AREA] button.**

The [AREA] submenu appears.
- 3 Press the [FRAME] button.**

The [FRAME] submenu appears.
- 4 Press the [HIDE] and [SHOW] buttons to select the display status of the metering area.**

When the [SHOW] button is pressed, the metering area frame is displayed on the screen.
- 5 To return to the [MAIN MENU], press the [← MAIN] button.**

Pressing the [X] button closes the [EXP & COLOR SETTING] menu.



Showing the metering area

5

Operating the MAIN Menu

Moving a metering area

Move the metering area on the screen.

- 1 Open the [EXP & COLOR SETTING] menu.**

Press the [SETTING] button in the [MAIN MENU] and press the [EXP & COLOR] button in the [SETTING] submenu.

- 2 Press the [AREA] button.**

The [AREA] submenu appears.

- 3 Press the [MOVE] button.**

The operation menu changes to the [MOVE] menu.

A frame appears around the metering area.

- 4 Drag the metering area frame on the screen to move it to an arbitrary position.**

Press the [CTRNG] button to return the area to the center of the screen.

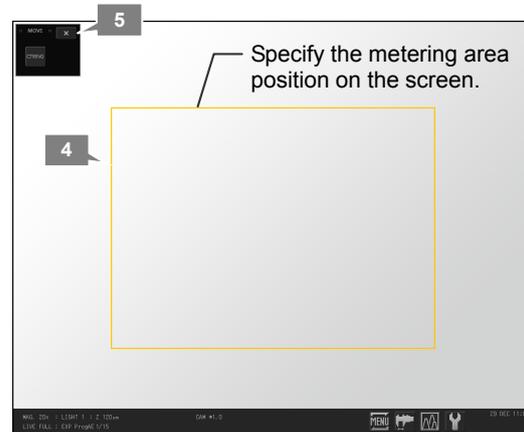
Note: The metering area cannot be moved outside the image. Specify a point so that the entire metering area can be placed within the image.

- 5 When the area has moved to the desired position, press the [X] button to close the [MOVE] menu.**

The [EXP & COLOR SETTING] menu returns.

- 6 To return to the [MAIN MENU], press the [← MAIN] button.**

Pressing the [X] button closes the [EXP & COLOR SETTING] menu.



Moving the metering area

(5) Adjusting the image quality

Set the details of the image capture quality.

- 1 Open the [EXP & COLOR SETTING] menu.**

Press the [SETTING] button in the [MAIN MENU] and press the [EXP & COLOR] button in the [SETTING] submenu.

- 2 Use any of the buttons shown below and adjust the image quality on the corresponding submenus.**

Adjust the image quality by buttons and sliders while checking the live image. To complete setting, press the [OK] button.

On a submenu that includes only buttons, pressing a button finishes the setting.

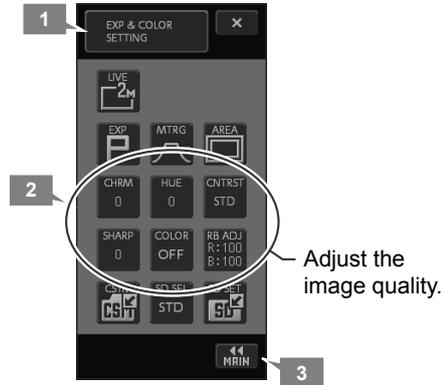


Image quality adjustment

- **[CHRM] (chroma)**
-50 to +50, Step 1
(Default: 0)



- **[HUE] (hue)**
-50 to +50, Step 1
(Default: 0)



- **[CNTRST] (contrast)**
Select one from seven preset values. (Default: STD) See the next page for details about preset values.

- WIDE D
- WEAK
- STD
- STRONG
- LINEAR
- METAL
- ENH

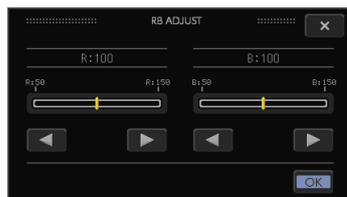
- **[SHARP] (edge enhancement)**
-3 (soft) to 5 (sharp)
(Default: 2)



- **[COLOR] (color effect)**
 - OFF (default)
 - B&W
 - NEGA



- **[RB ADJ] (RB adjustment)**
Adjust the color shade by changing the amount of red (R) and blue (B). Adjustment is available in the range between 50 and 150, referencing the state at the white balance setting as 100. (Default: 100, Step 2)



- 3 To return to the [MAIN MENU], press the [◀ MAIN] button.**

Pressing the [X] button closes the [EXP & COLOR SETTING] menu.

✔ Contrast setting

Contrast setting is performed by selecting one from the following seven preset values. Select a setting suitable to the object.

- **WIDE D (wide dynamic range)**
Select this when dark-to-bright gradation is required for the object with partial highlight reflection.
- **WEAK (contrast: weak)**
Select this to weaken the contrast.
- **STD (contrast: standard, default)**
Select this for normal capturing.
- **STRONG (contrast: strong)**
Select this to strengthen the contrast and sharpen the image.
- **LINEAR**
Select this to obtain a linear output with respect to the input. Use this mode to check the difference of illumination intensity from the captured data.
- **METAL: Contrast for metal**
Select this to suppress unevenness of brightness and obtain high contrast image.
- **ENH (Enhanced contrast)**
Select this to enhance the contrast for observation.

(6) Using the custom setting

Registering a custom setting

The current setting for image capturing can be saved as a “custom mode.” Up to four settings can be saved as custom modes (CUSTOM1 to CUSTOM4).

1 Set conditions for image capturing.
Set desired conditions for image capturing by referring to the description of this chapter.

2 Open the [EXP & COLOR SETTING] menu.
Press the [SETTING] button in the [MAIN MENU] and press the [EXP & COLOR] button in the [SETTING] submenu.

3 Press the [CSTM] button.
The [CSTM] submenu appears.

4 Select a custom mode to register the current setting from among [CSTM1] to [CSTM4].
The current selection is marked with a blue frame around the button.

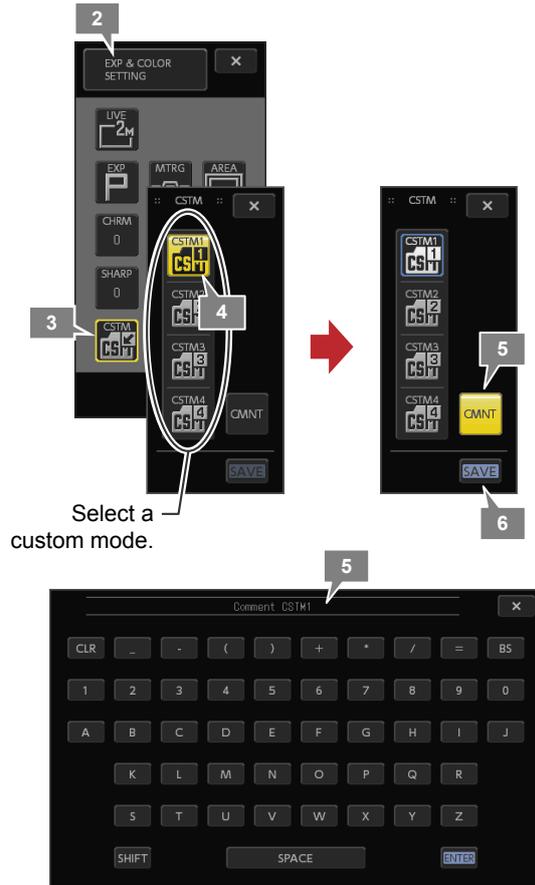
After selecting a custom mode, you may press the [SAVE] button to save the custom setting.

5 Press the [CMNT] button, if necessary, to add a comment to the custom setting with up to 16 characters.
When the [CMNT] button is pressed, the keypad appears. Press any keys to enter the necessary information.

The upper-case and lower-case characters can be switched by the [SHIFT] button. To delete the entry, press the [CLR] button. To move backward by one character, press the [BS] button. Pressing the [X] button closes the keypad without saving the comment.

6 To register the custom setting, press the [SAVE] button.
The current setting is saved as the selected custom mode and the [CSTM] submenu closes. Pressing the [X] button closes the [EXP & COLOR SETTING] menu.

7 To return to the [MAIN MENU], press the [◀ MAIN] button.
Pressing the [X] button closes the [EXP & COLOR SETTING] menu.



Registering a custom setting

5 Operating the MAIN Menu

✔ Comments in the custom setting

A comment entered in the custom setting is displayed as a tooltip of the button selected when the custom setting is called.

Calling a custom mode

The settings you registered as custom modes can be called by selecting a custom mode at the time of scene mode selection.

1 Open the [MAIN MENU].

Press the [MENU] button on the status bar. If any other operation menu is on the screen, press the [MENU SELECT] button and select [MAIN] in the submenu.

2 Press the [SCENE] button.

The [SCENE] submenu appears.

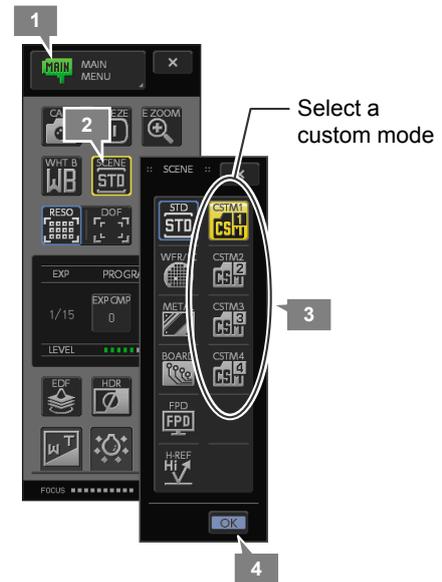
3 Press one of the [CSTM1] to [CSTM4] buttons.

The current selection is marked with a blue frame around the button.

The comment entered at the time of registration is displayed as a tooltip.

4 Press the [OK] button.

The submenu closes and the icon of the [SCENE] button changes in accordance with the selection.



Calling a custom mode

5

Operating the MAIN Menu

✔ Settings at power-on

The selected custom mode is saved when the power is turned off. The saved custom mode will be applied when the power is turned on again. However, if the custom setting is set to be enabled at the time of startup, the custom mode setting will be applied.

✔ Conditions to be registered to a custom mode

- Exposure mode (Program AE, Shutter-priority AE, and Manual)
- Shutter speed (in the Shutter-priority AE or Manual mode)
- Camera gain (in the Manual mode)
- Exposure compensation (in the Program AE or Shutter-priority AE mode)
- Metering method (in the Program AE or Shutter-priority AE mode)
- Metering area (in the Program AE or Shutter-priority AE mode)
- Image quality setting
- Light area
- Brightness level

✔ Hi-reflection custom setting

The custom setting registered when Hi-reflection Sample is selected as the scene mode is the “Hi-reflection custom setting.”

Icons for the Hi-reflection custom setting can be distinguished from the standard custom setting by the characters “Hi1” to “Hi4” in the custom setting selection menu. (Note that the standard custom setting icons are used when registering.)

When the Hi-reflection custom setting is used, the brightness of the LED illumination is fixed to 10 (max. value) and the shutter speed range is expanded from 1/20000 of a second to 1 second. When the exposure mode is switched to “Shutter-priority AE” or “Manual” in this state, the shutter speed can be adjusted within the range of 1/20000 of a second to 1 second (30 levels).



Standard custom setting



Hi-reflection custom setting

(7) Correcting shading

The shading compensation corrects unevenness of sensitivity due to gradual decrease of brightness from the center to the ends of the screen. Two types of shading compensation values are available: “Standard” that is used for P-400Rv/P-400R ring illuminator and “User” that is used for calculating the compensation value by shading measurement in an arbitrary illumination status.

- **[STD]**
The shading compensation value (standard shading compensation value) for the P-400Rv/P-400R ring illuminator is set. Select [STD] when using the P-400Rv/P-400R ring illuminator. The setting of the standard shading compensation value cannot be changed.
- **[USER]**
Correct shading by recalling the compensation value (user shading compensation value) that has been set in advance after measuring the shading under the actual illumination condition. Select [USER] when illumination other than the P-400Rv/P-400R ring illuminator is used.

Selecting a shading compensation value

Select the shading compensation value between [STD] and [USER].

- 1 Open the [EXP & COLOR SETTING] menu.**
Press the [SETTING] button of the [MAIN MENU] and press the [EXP & COLOR] button in the [SETTING] submenu.
- 2 Press the [SD SEL] button.**
The [SD SEL] submenu is displayed.
- 3 Select the shading compensation value from the following two options:**
 - **[STD] (initial setting)**
Use the shading compensation value for the P-400Rv/P-400R ring illuminator.
 - **[USER]**
Use the user shading compensation value that has been set.

Press the button to close the submenu and the selected setting is displayed on the [SD SEL] button.
- 4 To return to the [MAIN MENU], press the [← MAIN] button.**



Selecting the shading compensation value

✔ Using [USER]

- Setting of the user shading compensation value is required for using [USER]. See “Measuring and setting the shading” on next page for details on how to set the compensation value.
- If [USER] is selected without setting the shading compensation value, “NO USER SD DATA” is displayed on the status bar. Shading is corrected using the standard shading compensation value.
- Even though shading measurement fails at some zoom magnifications, the user shading compensation value can be set. If [USER] is selected in this state, shading at zoom magnifications at which shading measurement has failed is corrected using the standard shading compensation value with “NO USER SD DATA” displayed on the status bar.

Measuring and setting the shading

Prepare an object of a homogeneous color. Measure the shading of the object at each zoom magnification and set the [USER] shading compensation value.

✓ Aperture setting and user shading compensation

Changing the aperture setting changes the shading state. Be sure to measure the shading and set the compensation value again when the aperture setting is switched using the [RESO] or [DOF] button in the [MAIN MENU] or [EASY MENU].

5

Operating the MAIN Menu

1 Set an object of a homogenous color on the stage so that it is displayed on the full screen.

2 Adjust the illumination to the state in which a sample is to be observed.

3 Change the zoom magnification from 1x through 20x and check that the object has no remarkable scratches or stains.

4 Focus on the specimen.

Nikon recommends using the 20x zoom magnification.

Note: Shading measurement can be started regardless of the zoom magnification level.

5 Open the [EXP & COLOR SETTING] menu.

Press the [SETTING] button of the [MAIN MENU] and press the [EXP & COLOR] button in the [SETTING] submenu.

6 Press the [SD SET] button.

The [SD SET] submenu is displayed.

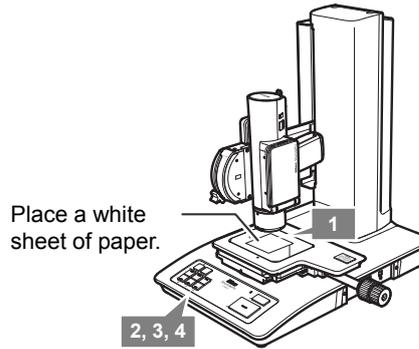
7 Press the [SD CALC] button

The zoom magnification is automatically switched (16 levels) and shading is measured at each zoom magnification. The icon of the button changes to [STOP] during measurement and the progress is displayed on the progress bar.

Note: Pressing the [STOP] button during measurement stops the measurement. In this case, the shading compensation value cannot be set.

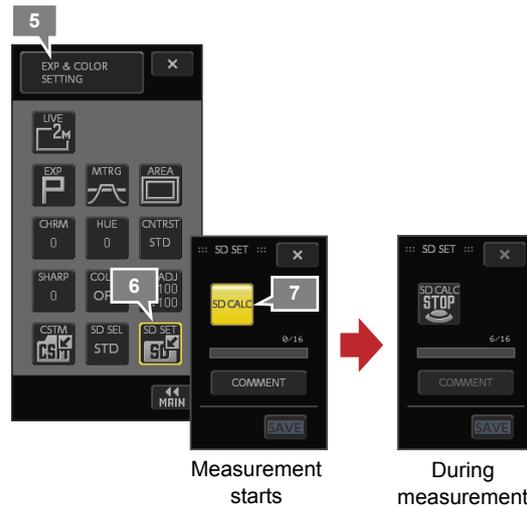
When measurement at all zoom magnifications is completed, a blue frame is displayed around the button and the measurement completion message is displayed.

8 Press the [OK] button to close the confirmation message for measurement completion.



Place a white sheet of paper.

Preparing a homogeneous object



Measurement starts

During measurement

Measuring the shading



Measurement completed

9 Press the [COMMENT] button to add a comment to the shading setting as required.

Press the [Comment] button to display the keypad. Press keys to enter the necessary information.

Use the [SHIFT] button to switch the upper-case and lower-case characters. To delete the entry, press the [CLR] button. To move backward by one character, press the [BS] button. After the comment is entered correctly, press the [ENTER] button to close the keypad. Pressing the [X] button closes the keypad without changing the value.

Note: The entered comment is displayed as a tooltip when the shading compensation value is selected.

When a comment is entered, a blue frame appears around the [COMMENT] button of the [SD SET] submenu.

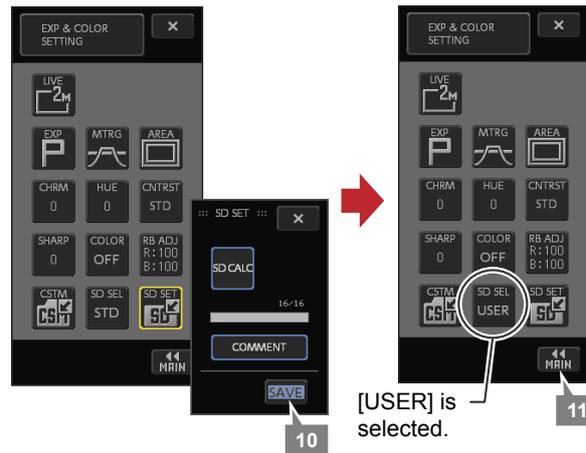


Entering a comment

10 Press the [SAVE] button to set the shading compensation value.

The shading compensation value corresponding to each zoom magnification at which measurement has been completed is set and the [SD SET] submenu closes.

When the shading compensation value is set, [USER] is displayed on the [SD SEL] button, and the [USER] shading compensation value is automatically selected.



Saving the shading compensation value

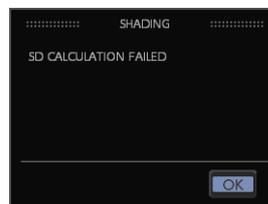
11 To return to the [MAIN MENU], press the [MAIN] button.

✔ When shading measurement fails

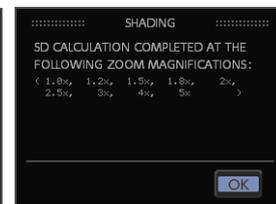
- Shading measurement may fail if illumination is too bright or too dark. Adjust the illumination and try shading measurement again.
- If measurement fails at a zoom magnification, the zoom magnifications at which measurement has been completed are displayed in the message.

The compensation value can be set in this state; however, shading at zoom magnifications at which shading measurement has failed is corrected using the standard shading compensation value with “NO USER SD DATA” displayed on the status bar.

Adjust the illumination and try shading measurement again as required.



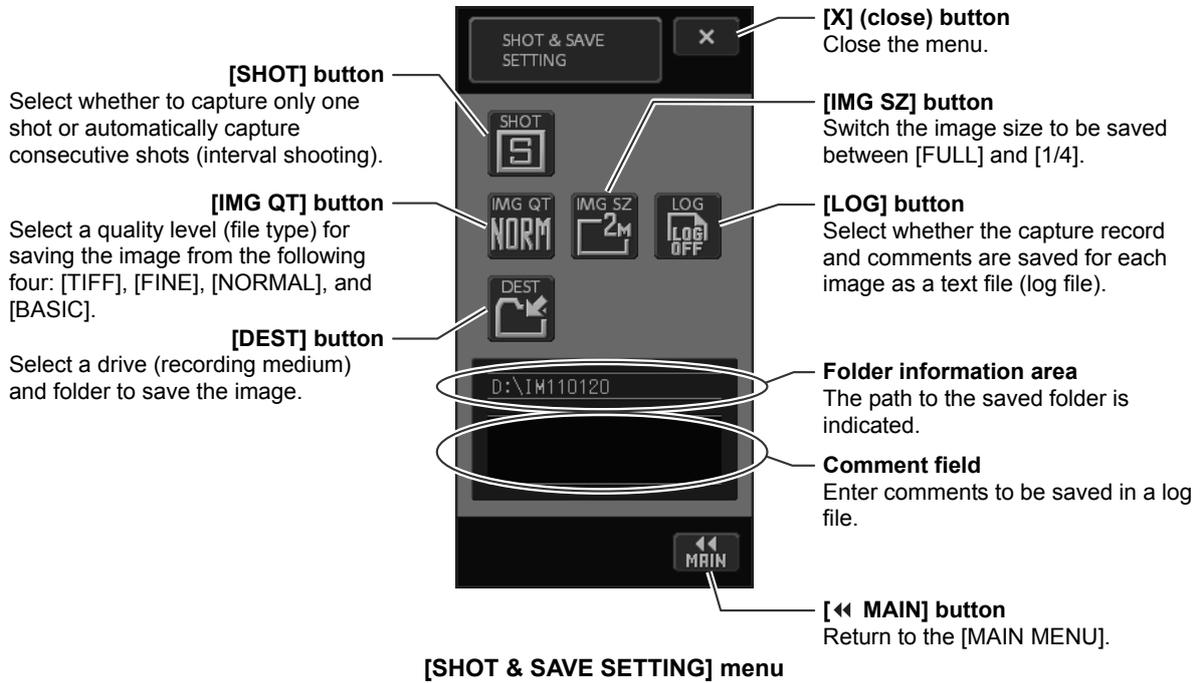
Measurement fails



Measurement completed at some zoom magnifications

5.4.2 Shot and Save Settings

The [SHOT & SAVE SETTING] in the [CAMERA SETTING] menus has buttons to perform settings for capturing and saving images.



[SHOT & SAVE SETTING] menu items

Button and area	Content	Ref.
[SHOT] button	When capturing an image, select whether to capture only one shot or automatically capture consecutive shots (interval shooting).	p.103
[IMG QT] button	Select the quality level (file type) of the image to be saved from the four types: [TIFF], [FINE], [NORMAL] and [BASIC].	p.104
[IMG SZ] button	Switch the size of the image to be saved between [FULL] (2M: 1600x1200) and [1/4] (0.5M: 800x600)	p.105
[LOG] button Comment field	[LOG] button: Select whether to save the capture record and comment for each image as a text file (log file). Comment field: Enter the comment to be saved in the log file.	p.106 p.109
[DEST] button Folder information area	[DEST] button: Specify a drive (storage medium) and a folder, in which an image is to be saved. Information of the path of the specified folder is displayed in the Folder information area.	p.107

(1) Setting the shot mode

Select a shot mode from “One Shot” (single image capturing) and “Continuous Shot” (interval shooting).

1 Open the [SHOT & SAVE SETTING] menu.

Press the [SETTING] button in the [MAIN MENU] and select the [SHOT & SAVE] button in the [SETTING] submenu.

2 Press the [SHOT] button.

The [SHOT] submenu appears.

3 Select a shot mode.

- **[ONE]**
Captures one image.
- **[CONT]**
Captures the specified number of images at the specified interval consecutively.

When one of the above is pressed, the submenu closes and the icon of the [SHOT] button changes accordingly.

When [CONT] is selected, the [COUNT] button and the [INTVAL] button appear in the [SHOT & SAVE SETTING] menu. Set the number of images to be captured and the capturing interval in accordance with steps 4 and 5 below.

4 Press the [COUNT] button and set the number of images to be captured in the [COUNT] submenu. Then press the [OK] button to finish the setting.

- **Number of images to be captured (factory default: 2)**
2 to 999

The specified value is indicated on the [COUNT] button.

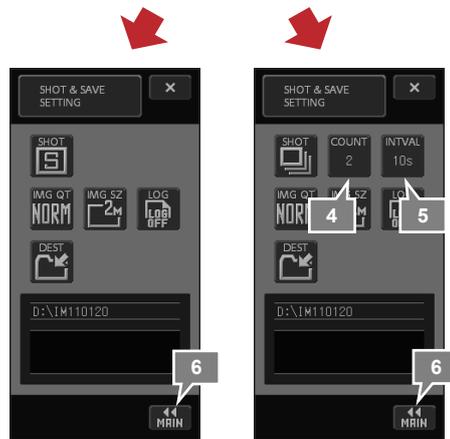
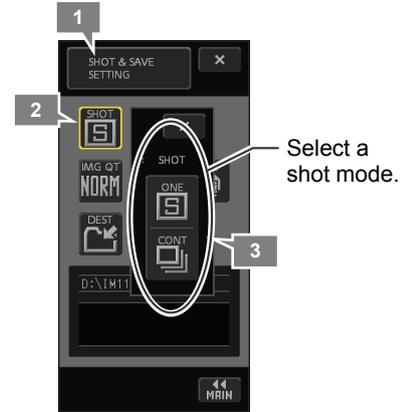
5 Press the [INTVAL] button and set an interval between shots in the [INTERVAL] submenu. Then press the [OK] button to finish the setting.

- **Interval between shots (factory default: 10s)**
10s, 15s, 20s, 30s, 45s, 60s, 1m30s, 2m, 3m, 4m30s, 6m, 10m, 15m, 20m, 30m, 45m, 60m, 1h30m, 2h, 3h, 4.5h, and 6h (s: second, m: minute, h: hour, 22 levels)

The specified value is indicated on the [INTVAL] button.

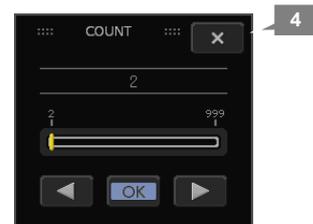
6 To return to the [MAIN MENU], press the [← MAIN] button.

Pressing the [X] button closes the [SHOT & SAVE SETTING] menu.

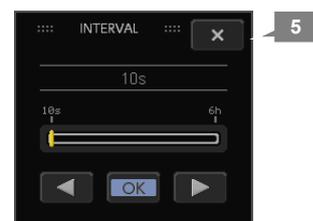


For a single shot For multiple consecutive shots

Selecting a shot mode



Setting the number of shots



Setting the interval between shots

(2) Selecting an image quality mode (file type)

Select an image quality (file type) for saving images.

1 Open the [SHOT & SAVE SETTING] menu.

Press the [SETTING] button in the [MAIN MENU] and select the [SHOT & SAVE] button in the [SETTING] submenu.

2 Press the [IMG QT] button.

The [IMG QT] submenu appears.

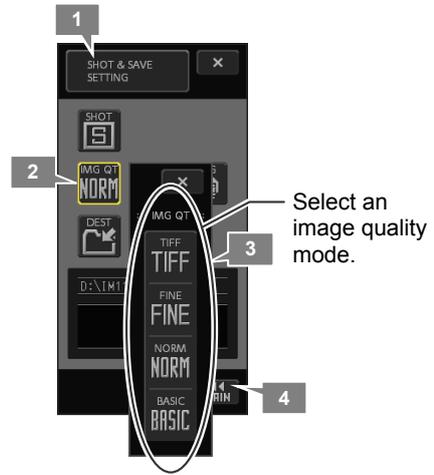
3 Press any of the following buttons to select an image quality (file type) of the image to be saved.

- **[TIFF]**
Saves an image in the 8-bit non-compressed TIFF-RGB format.
- **[FINE]**
Saves an image in the JPEG format by compressing it to about 1/4.
- **[NORMAL]**
Saves an image in the JPEG format by compressing it to about 1/8.
- **[BASIC]**
Saves an image in the JPEG format by compressing it to about 1/16.

When one of the above is pressed, the submenu closes and the icon of the [IMG QT] button changes in accordance with the selection.

4 To return to the [MAIN MENU], press the [← MAIN] button.

Pressing the [X] button closes the [SHOT & SAVE SETTING] menu.



Selecting an image quality mode

5

Operating the MAIN Menu

✔ Image files

- When TIFF is selected, the header file of TIFF is saved.
- When any of TIFF, JPG BASIC, JPG NORMAL, and JPG FINE is selected, the Exif 2.2 data is inserted in the file.

(3) Selecting a size of the image to be saved

Select a size for saving images.

1 Open the [SHOT & SAVE SETTING] menu.

Press the [SETTING] button in the [MAIN MENU] and select the [SHOT & SAVE] button in the [SETTING] submenu.

2 Press the [IMG SZ] button.

The [IMG SIZE] submenu appears.

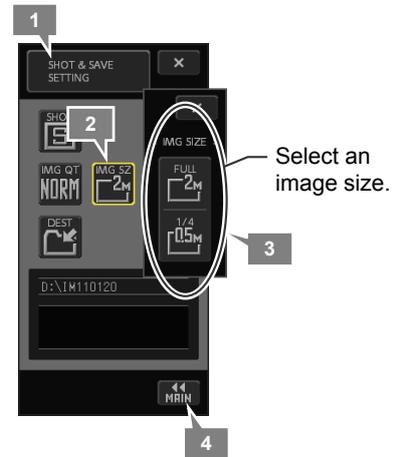
3 Press one of the following buttons to select a size of the image to be saved.

- **[FULL]**
2M: 1600 x 1200 pixels
- **[1/4]**
0.5M: 800 x 600 pixels

When one of the above is selected, the icon of the [IMG SZ] button changes accordingly.

4 To return to the [MAIN MENU], press the [◀ MAIN] button.

Pressing the [X] button closes the [SHOT & SAVE SETTING] menu.



Selecting an image size

✔ Display size and storage size of an image

This system allows you to set different sizes for the live image size on the touch panel monitor screen and for the storage size to save the image. To change the live image display size, see “5.4.1 Selecting a display size of the live image.”

✔ Restrictions regarding the image size change

The [IMG SIZE] setting cannot be changed when an EDF, HDR, still (freeze) or playback image is displayed.

✔ Restrictions on display and storage sizes during special capturing

- EDF images are always captured in 800x600 size. When EDF image capturing is started, the display size automatically changes to 800x600.
- If the storage size is set to [FULL] (2M), when an HDR or still (freeze) image is captured, the captured image is displayed in 1280x960 size.
- When a playback image that has been taken by the ShuttlePix (this system or a stand-alone P-400Rv/P-400R) is captured, it is saved with the original image size. If a playback image that has been taken by a device other than ShuttlePix is captured, it is saved in 1280x960 size.

(4) Switching between on and off of the log saving

This system allows you to save the capture record and comments (log file) for each image file as a text file.

- 1 Open the [SHOT & SAVE SETTING] menu.**

Press the [SETTING] button in the [MAIN MENU] and select the [SHOT & SAVE] button in the [SETTING] submenu.

- 2 Press the [LOG] button.**

The [SAVE LOG] submenu appears.

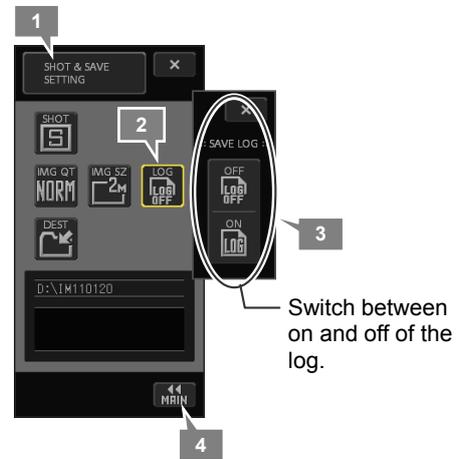
- 3 Press the [ON] or [OFF] button to enable or disable the log saving.**

The [SAVE LOG] submenu closes.

When the [ON] or [OFF] button is pressed, the icon of the [LOG] button changes accordingly.

- 4 To return to the [MAIN MENU], press the [MAIN] button.**

Pressing the [X] button closes the [SHOT & SAVE SETTING] menu.



Switching between ON and OFF of the log saving

✔ Log file saving

The log file for capture record is created for each image file. The log file is named as “image file name + extension (.txt).”

Content of the log file

The following data is recorded in the log.

- **Example: Log file sample**

```
22094131.JPG  2010/12/29  11:41:31

LOG:

<ShuttlePix P-MFSC>
Zoom: 1.0x
Light value: 0
Aperture: Resolution-priority
Z position: 0um(Absolute)
Scene mode: Custom3

ABCDE
```

Note: The comment entered in the [SHOT & SAVE SETTING] menu is saved at the end of the log file. (“ABCDE” in the last line is the comment in the above example.) For details on how to enter the comment, see “5.4.2 Entering a comment.”

(5) Specifying a save folder

To save an image, it is necessary to specify a drive (recording medium) and a folder to save it. The folder specified as the destination to save the image is called a “save folder.”

1 Open the [SHOT & SAVE SETTING] menu.

Press the [SETTING] button in the [MAIN MENU] and select the [SHOT & SAVE] button in the [SETTING] submenu.

2 Press the [DEST] button.

The [SAVE FOLDER] submenu appears.

3 Specify a drive and a folder to save images in the [SAVE FOLDER] submenu.

- **Selecting a drive**
Select a drive letter of the recording medium (USB memory: D to F in the order of connection, SD card: G). The selected drive is marked with a blue frame.
- **Selecting a folder**
When a drive is selected, the folders within the drive are displayed. Select a folder from the list. The selected folder is marked with a yellow frame.
- **Creating a new folder**
A new folder can be created within the folder selected from the folder list. Press the [NEW] button in the [SAVE FOLDER] submenu. The keypad appears. Enter an arbitrary folder name and press the [ENTER] button.
- **Deleting a folder**
To delete the folder selected from the folder list, press the [DEL] button. A confirmation message appears. Press [YES] or [NO].

Note: Up to the 6th folder from the root folder are available for folder selection for the storage destination and new folder creation.

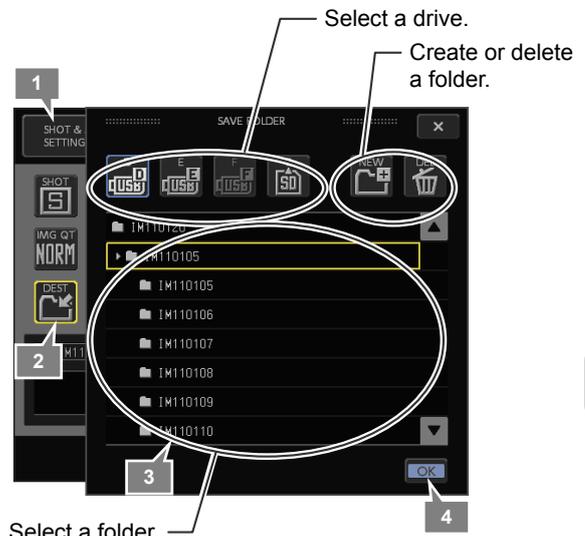
4 After selecting a drive and a folder, press the [OK] button to complete the setting.

The [SAVE FOLDER] submenu closes and the save folder is set.

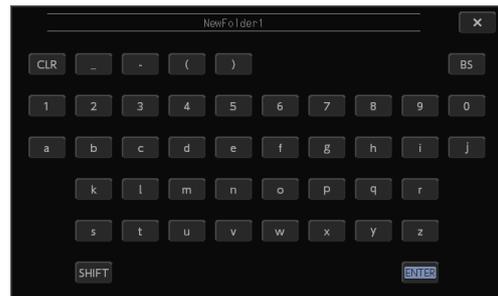
The path of the determined save folder is indicated in the folder information area of the [SHOT & SAVE SETTING] menu.

5 To return to the [MAIN MENU], press the [MAIN] button.

Pressing the [X] button closes the [SHOT & SAVE SETTING] menu.



Selecting a destination folder



Specifying a new folder name (keypad)



Confirmation for folder deletion



Displaying the path of the save folder

❗ Finishing the setting

If the destination folder was changed, press the [OK] button before closing the [SAVE FOLDER] submenu. If the [X] button is pressed to close the submenu, the destination folder will not be changed.

❗ Changing the recording medium configuration

- When the recording medium assigned to the destination folder is removed, images are saved onto another recording medium if there is. When the configuration of the recording medium is changed, be sure to check the destination setting.
- If all recording media are removed, an error occurs at the time of image capturing.

✔ Automatic folder generation

If the automatic folder creation is set to ON in the [SETUP MENU: FILE] window, a folder is created within the specified destination folder and the image file is saved in the created folder.

(6) Entering a comment

Enter an arbitrary comment and save it in the log file.

1 Open the [SHOT & SAVE SETTING] menu.

Press the [SETTING] button in the [MAIN MENU] and select the [SHOT & SAVE] button in the [SETTING] submenu.

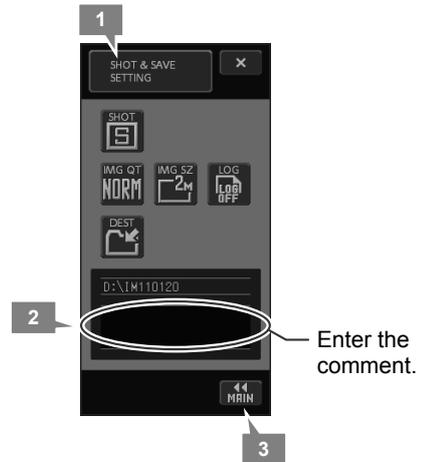
2 Press the comment field and add a comment to be saved in the log file.

When the comment field is pressed, the keypad appears. Press any key to enter necessary information and press the [ENTER] key.

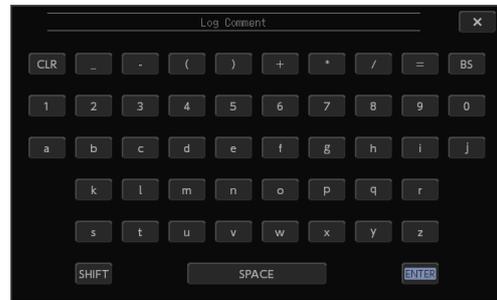
The upper-case and lower-case characters can be switched by the [SHIFT] button. To delete the entry, press the [CLR] button. To move backward by one character, press the [BS] button. Pressing the [X] button closes the keypad without changing the value.

3 To return to the [MAIN MENU], press the [MAIN] button.

Pressing the [X] button closes the [SHOT & SAVE SETTING] menu.



Entering a comment



Entering a log comment (keypad)

5.5 Capturing an Image

Capture the image displayed on the touch panel monitor and save it in the specified destination folder as an image file.

❗ Confirmation of the basic settings

Before capturing an image, confirm the following settings.

- **Save folder selection**
(See “5.4.2 Specifying a save folder.”)
- **Image quality mode (file type) selection**
(See “5.4.2 Selecting an image quality mode (file type).”)
- **Image storage size selection**
(See “5.4.2 Selecting a size of the image to be saved.”)

❗ Precautions for saving images

While an image is being saved, do not remove the recording medium or network cable. Doing so may cause improper image recording or damage to this system or to the recording medium.

✔ Names of image files

When images are captured using the [MAIN MENU], whether image files are named automatically or manually in capturing can be selected in the [SETUP MENU: FILE] window.

For details on the procedure for changing the file naming system or convention, see “8.4.2 Configuring File Naming System and Convention.”

✔ Capture sound

A capture sound is emitted when an image is captured. To change sound volume, see “8.5.5 Configuring Other Settings.”

✔ Using the annotation function and the simplified measurement function

When pen drawing, text annotation, or distance or angle measurement is performed, the results can be embedded in the image to be saved.

See “7 Using Annotation and Simplified Measurement” for details about the annotation function and simplified measurement function.

✔ Display of the [SPECIAL CAPTURE] buttons

The [SPECIAL CAPTURE] buttons in the [MAIN MENU] can be switched to be shown or not in the [SETUP MENU: MAIN] window.

The [SPECIAL CAPTURE] buttons include the [EDF], [HDR] and [HALO] buttons. Display the [SPECIAL CAPTURE] buttons to obtain an EDF, HDR or halation-free image in the [MAIN MENU]. Hide these buttons when these images are not captured. The display size of the main menu can be reduced.

See “8.2.1 Customizing the [MAIN MENU] display” for details on how to perform settings.



Buttons not shown

[SPECIAL CAPTURE] buttons

[SPECIAL CAPTURE] buttons in the [MAIN MENU]

5.5.1 Performing Basic Photography

The following two methods are available to capture the live image displayed on the touch panel monitor and save it as an image file.

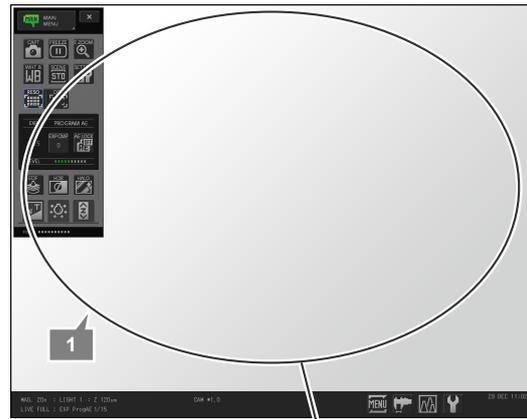
- (1) Capturing the live image directly
- (2) Capturing after freezing the live image

(1) Capturing the live image directly

Use the [MAIN MENU] to capture the live image being observed on the touch panel.

1 Check the live image.

Check that the object is displayed at the proper brightness and with focus on the desired part.



Check the live image.

Checking the live image

2 Press the [CAPT] button in the [MAIN MENU].

The image is captured in accordance with the setting and the image file is saved in the specified destination.

Note: When image files are set to be named manually in capturing, pressing the [CAPT] button displays the [SAVE AS] window. For details on the procedure for handling, see “Naming and saving an image when captured” described on the next page.

A capture sound is emitted when an image is captured. While the image is being saved, the pointer shape changes and the “Saved..1/1” message appears on the status bar.

After the image is saved, the system returns to the operable state.



Capturing the live image

✔ Naming and saving an image when captured

When the [SAVE AS] checkbox in the [FILE NAME] area in the [SETUP MENU: FILE] window is selected, pressing the [CAPT] button displays the current image as a still image and the [SAVE AS] window on the screen.

When this screen is displayed, check the destination folder, image file name and image quality setting, and change the setting as required. Pressing the [SAVE] button closes this window and saves the image in accordance with the setting you have made.

[FOLDER] field

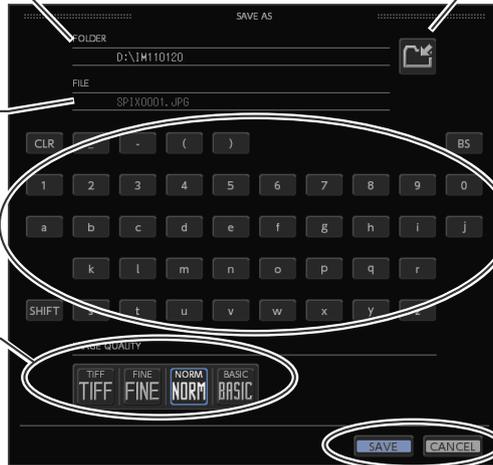
Displays the folder set as the destination folder of the image to be saved.

[FILE] field

Displays the initial file name automatically set. To change the file name, enter a new file name (max. of 26 letters) using the keypad. A file extension is automatically added to the end of the file name.

[IMAGE QUALITY] buttons

Select the quality of the image to be saved from [TIFF], [FINE], [NORM] and [BASIC]. The file extension changes in accordance with the selection. ".TIF": when [TIFF] is selected
".JPG": when [FINE], [NORM] or [BASIC] is selected.



[Destination] button

Use this button to change the destination folder. Select the drive and folder as a destination and press the [OK] button in the [SAVE FOLDER] window.

Keypad

To change the file name, directly enter the file name from the keypad. To switch to upper-case letters, use [SHIFT], to delete one letter, use [BS] and to delete the entry, use [CLR].

[SAVE] / [CANCEL] button

To save the image, press the [SAVE] button, and to discard the image, press the [CANCEL] button.

Naming and saving an image when capturing ([SAVE AS] window)

Note: If the [SAVE MEDIA] checkbox in the [SETUP MENU: ADDITIONAL] window is not selected, the destination folder cannot be specified. For details on the procedure for changing the setting, see "8.5.2 Configuring Capture Function."

(2) Capturing after freezing the live image

To freeze the live image and then capture the frozen still image, perform the following procedure.

1 Check the live image.

Check that the object is displayed at the proper brightness and with focus on the desired part.

2 Press the [FREEZE] button in the [MAIN MENU].

The image at the point when the button is pressed is displayed as a still image on the touch panel monitor.

While the still image is displayed, a blue frame appears around the [FREEZE] button. [FREEZE] is displayed in the middle of the status bar.

Pressing the [FREEZE] button again releases the freeze status. The live image returns and the status bar display changes from [FREEZE] to [CAM].

Note: The operation to change the scene mode is restricted while the still image is displayed.

3 Check the still image state.

Check that the still image is displayed as desired.

To obtain the still image again, press the [FREEZE] button to release freezing and press it again while checking the live image.

4 To save the image, press the [CAPT] button in the [MAIN MENU].

A capture sound is emitted, and the image is captured in accordance with the settings and saved in the specified save folder.

While the image is being saved, the pointer shape changes on the touch panel. The "Saved..1/1" message appears on the status bar to indicate that the image has been saved.



Obtaining and capturing a still image



Status bar indication (still image)

✔ Names of image files

When image files are set to be named manually in capturing, pressing the [CAPT] button displays the [SAVE AS] window. Set the destination folder, file name and quality of the image to be saved, and then press the [SAVE] button to save the file.

✔ Image size when capturing a still image

When a still image is captured after freezing the image, if the storage size of the image is set to [FULL] (2M), the captured image is displayed in 1280x960 size.

5.5.2 Performing Interval Shooting

When [CONT] is selected as the shot mode, execution of the interval shooting can be controlled using the [CAPT] button in the [MAIN MENU].

✔ Shot mode setting

The shot mode setting can be made in the [SHOT & SAVE SETTING] window. See “5.4.2 Setting the shot mode” for details about setting.

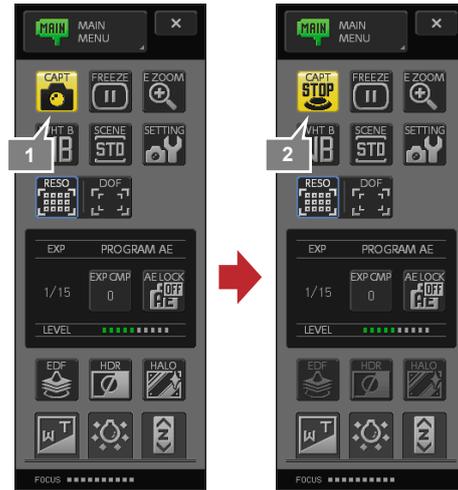
1 To start the interval shooting, press the [CAPT] button in the [MAIN MENU].

The first shot of the interval shooting is captured and the icon of the [CAPT] button changes to “STOP.”

The second and subsequent shots are captured automatically at the specified interval until the specified number of shots is captured.

When the specified number of images has been captured, the interval shooting terminates automatically.

2 To stop the interval shooting halfway, press the [CAPT] button again.



Starting and stopping interval shooting

✔ Names of image files

In interval shooting, image files are automatically named in accordance with the setting in the [SETUP MENU: FILE] window, regardless of the setting of the [SAVE AS] checkbox.

✔ Image capture condition change during interval shooting

This system allows you to change the capturing conditions from the motorized stand or the operation menu while the interval shooting is in progress.

- The exposure or focus can be changed during interval shooting to capture the changes of the object's appearance.
- If it is necessary to capture the object under a fixed condition to observe time variation of the object, etc., do not change the condition during interval shooting.

✔ Restrictions for interval shooting

- EDF, HDR and halation elimination operations cannot be performed during interval shooting.
- Images for interval shooting cannot be output to a printer. The setting of [CAPTURE FUNC] - [PRINT] in the [SETUP MENU: ADDITIONAL] window is disabled during interval shooting.

5.5.3 Capturing EDF Images

This system enables you to create EDF images with a simple operation.

(1) EDF image

The EDF (Extended Depth of Focus) image is an all-in-focus image created by combining multiple images of an object captured at different focus points.

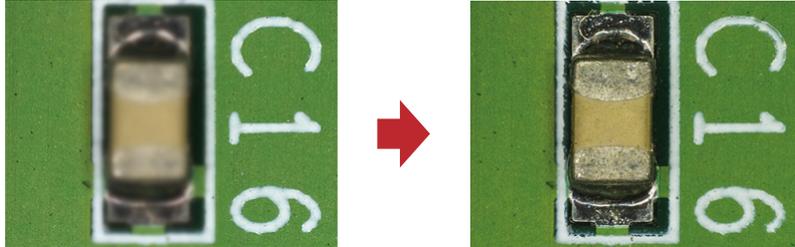


Figure: Examples of normal image and EDF image

When EDF image acquisition is started, the system calculates the depth of focus of the lens in accordance with the zoom magnification information, and moves the arm of the stand to suitable positions for capturing. Capturing with a specified height terminates and the EDF image is automatically created and displayed on the touch panel monitor. To save the EDF image, capture it in this state.

When the EDF image is saved, the 3D image generation data with an extension of “.d3d” can be saved together with the image file (TIFF or JPEG) of the EDF image. Note that individual shots at different heights are not saved as image files.

! Image size of EDF images

Only EDF images of 800x600 (0.5M) can be captured using this system. Even though the size is set to [FULL] (2M), the display size automatically changes to 800x600 when EDF image capturing starts. After an image is captured, the display size returns to the original size when the EDF image is closed.

(2) Notes on capturing EDF images

When capturing an EDF image, note the following points.

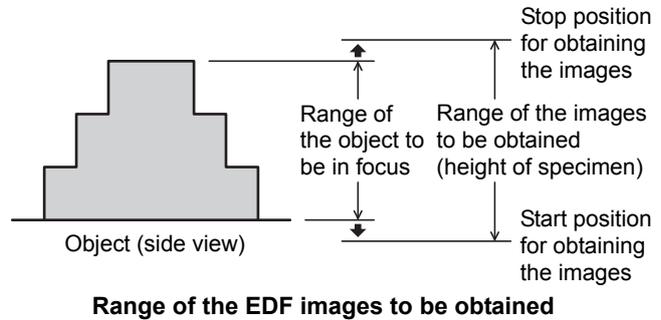
1. Set a value larger than the range of the EDF images to be obtained.

- **Start position for obtaining the images:**

When starting to obtain EDF images, focus on the lower position of the object. Adjust it to the slightly lower position of the range to be in focus.

- **Stop position for obtaining the images:**

Capture one or two extra images after the desired range of the object, and then stop capturing.



- **To stop the operation manually:**

After capturing the object in the specified range, confirm that one or two extra images were captured, and then stop the operation.

- **To stop the operation automatically:**

Set a value larger than the range (height) of the object to be captured to [HEIGHT OF SAMPLE] in the [EDF] submenu.

2. Notes on the object of the EDF images

- This system creates EDF images using the patterns on the object surface. EDF images or 3D image generation data may not be correctly generated if an object having no patterns, such as a mirror or glossy surface, is used.
- EDF images or 3D image generation data may not be correctly generated if an object is white and bright or black and dark. In this case, change the exposure and try again.

3. Notes on the setting for capturing

- When “DOF-priority” is set for the aperture, the image quality may not be as high as in “Resolution-priority.” In this case, a confirmation message is displayed in the [EDF] submenu. Select “Resolution-priority” for the aperture and widen the range (height) of the object to be captured if required.
- Setting the creation mode to [FINE] in the [EDF] submenu shortens the image acquisition intervals. As a result, clear images can be obtained.

(3) Capturing an EDF image

To capture an EDF image by operating the [MAIN MENU], perform the following procedure.

1 Place the specimen (object) on the stage.

2 Check the live image and make adjustment to obtain a proper view of the object.

Adjust the illumination and set a zoom magnification.

Notes

- Set image capture conditions such as a scene mode and white balance.
- When the EDF image capturing starts, the exposure is locked at that point.

3 Move the [VERTICAL MOVE] button to adjust the camera head to the slightly lower position of the range to be in focus.

Obtain the image of a wider range than that to be in focus.

4 Press the [EDF] button in the [MAIN MENU].

The [EDF] submenu appears.

✔ Setting the aperture

When image capturing is started with the aperture set to [DOF-priority], the following message is displayed at the lower part of the [EDF] submenu.

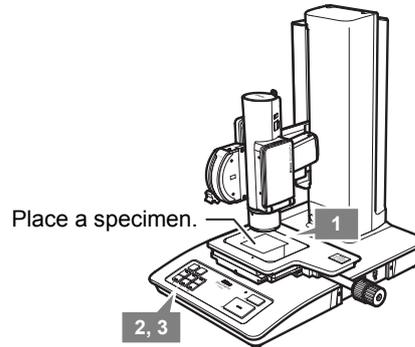
- IN DOF MODE, IMAGE MAY NOT BE AS CLEAR AS IN RESO MODE.

If your priority is image quality, press the [X] button in the [EDF] submenu to display the [MAIN MENU], change the aperture to [Resolution-priority] and press the [EDF] button again.

Note: See “5.3.2 Switching the Aperture Setting” for details.

5 Press the [MODE] button and select an EDF image creation mode from [FINE], [NORM] and [FAST].

- **FINE**
Fine mode (Process takes a long time.)
- **NORMAL**
Normal mode
- **FAST**
High speed mode (Fineness is reduced.)



Preparing an object



[EDF] submenu



Selecting a creation mode

- 6 Press the numeric value button of the [HEIGHT OF SAMPLE] area of the [EDF] submenu and enter the range (height: in 0.1 mm, Max. 30 mm) of the object to be captured.**

When the button is pressed, the keypad appears. Enter a numeric value and press the [ENTER] key. The entered value is displayed on the button.

Note: Set a value larger than the range (height) of the object to be captured.

- 7 Press the [START] button to start capturing for EDF image creation.**

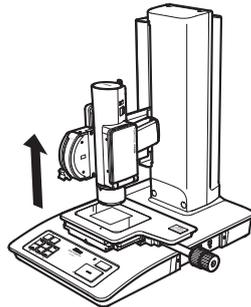
The camera head moves upward intermittently and captures an image each time it stops.

Note: When EDF image capturing is started, the display size automatically changes to 800x600.

The [START] button changes to [STOP] during image capturing. To stop the capturing halfway, press the [STOP] button.

When the images of the specified height range have been captured, capturing terminates automatically.

The camera head moves upward intermittently within the specified range and captures an image each time it stops.



EDF Image Capturing

The EDF image is automatically created based on the captured images and displayed on the touch panel monitor.

While the EDF image is displayed, frames appear around the [EDF] and [FREEZE] buttons, and “EDF” is indicated on the status bar.

Note: Operations such as changing the scene mode, etc. are restricted while the EDF image is displayed.

The [3D IMG GEN DATA] - [OUTPUT] checkbox appears at the lower area of the [EDF] submenu, and the [START] or [STOP] button changes to [OK].



Entering the height of object



Starting the EDF image capturing

✔ Error at the time of EDF capturing

An error occurs if no image is captured during EDF capturing operation.

8 Check the captured EDF image.

Check that the image is captured as desired.

9 To obtain the EDF image again, press the [RETRY] button.

The EDF image previously obtained is deleted. Perform the procedure from step 2 again.

10 When the EDF image is analyzed using the dedicated application “ShuttlePix Editor”, select the [3D IMG GEN DATA] - [OUTPUT] checkbox.

If the checkbox is selected, the 3D image generation data file with the same name as the image file is saved with an extension of “.d3d” when the EDF image is saved.

11 To save the EDF image, press the [CAPT] button.

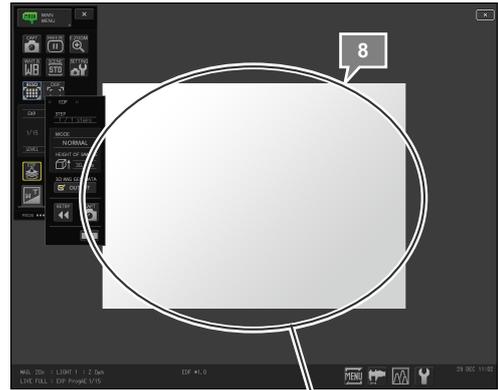
The EDF image file and 3D image generation data file (when [OUTPUT] is selected) are saved.

Note: The 3D image generation data file is used when analyzing EDF images on a PC using the ShuttlePix Editor.

12 Press the [OK] button to close the [EDF] submenu.

The EDF image remains on the screen.

Note: Pressing the [CAPT] button in the [MAIN MENU] in this state saves the EDF image.



Check the EDF image state.

Checking the EDF image



Output setting of the 3D image generation data



Saving the EDF image

5

Operating the MAIN Menu

✔ Names of image files

When image files are set to be named manually in capturing, pressing the [CAPT] button displays the [SAVE AS] window. Set the destination folder, file name and quality of the image to be saved, and then press the [SAVE] button to save the file.

13 To close the still image, press the [EDF] button, the [FREEZE] button, or the [X] button at the upper right corner of the window.

When the [X] button is pressed, a confirmation message is displayed. Press [YES] to close the image.



The live image returns and the blue frames around the [EDF] and [FREEZE] buttons disappear. The display in the middle of the status bar changes from [EDF] to [CAM].

Notes

- Make sure that the EDF image is saved before closing it. If it is closed without saving it, the captured image is discarded.
- If the display size was set to [FULL], the display returns to the original size when the EDF image is closed.



Closing the EDF image

! Obtaining and saving EDF images

- Depending on the object to be captured and capturing conditions, EDF images may not always be created correctly.
- The created EDF image cannot be saved until the [CAPT] button is pressed. To save the EDF image, press the [CAPT] button without fail.

✓ Analyzing the EDF image by the ShuttlePix Editor

When the EDF image is saved, the data file of the height information (extension “.d3d”) is saved together with the image file (extension “.tif” or “.jpg”). The height data file is used to analyze the EDF image by the dedicated application “ShuttlePix Editor.”

(4) Analyzing the EDF image by the ShuttlePix Editor

The dedicated application “ShuttlePix Editor” enables you to analyze the EDF image on your PC. Based on the EDF image and the height data file, the ShuttlePix Editor enables you to create the 3D (3-dimensional) data, such as a birds-eye view, a contour drawing, and a cross section graph of the 3D image.

5.5.4 Capturing HDR Images

This system enables you to create HDR images with a simple operation.

(1) HDR image

The HDR (High Dynamic Range) image is an image created by combining multiple images of an object captured at various exposures to reduce or enhance the difference between light and dark (dynamic range).

In a normal shot, a large difference between light and dark on the object may cause white-out or black-out in some parts. Also parts with almost no difference may be displayed homogeneously. The HDR process adjusts the light-dark difference to display details of such parts.

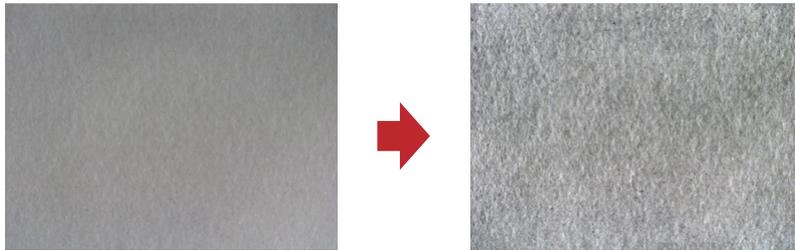


Figure Example of HDR Image

❗ Image size of the HDR image

If the storage size and the display size of the image are set to [FULL] (2M) and 800x600 (0.5M), respectively, when an HDR image is captured, the display size will automatically change to 1280x960.

✔ Brightness and hue variation and uneven brightness of the HDR image

The contrast is enhanced in HDR capturing. Depending on the object or capturing conditions, the captured image may be affected as follows:

- The brightness and hue may differ from the actual image.
- Uneven brightness may occur.

(2) Capturing an HDR image

To capture an HDR image, perform the following procedure.

- 1 Place the specimen (object) on the stage.**
- 2 Check the live image and make adjustment to obtain a proper view of the object.**

Adjust the illumination and zoom magnification and focus the camera on the desired part.

Note: Set image capture conditions such as a scene mode and white balance.

- 3 Press the [HDR] button in the [MAIN MENU].**

The [HDR] submenu appears and displays the HDR-composed still image.

A blue frame appears around the [FREEZE] button and "HDR" appears on the status bar.

The [X] button for closing the still image appears at the upper right corner of the screen.

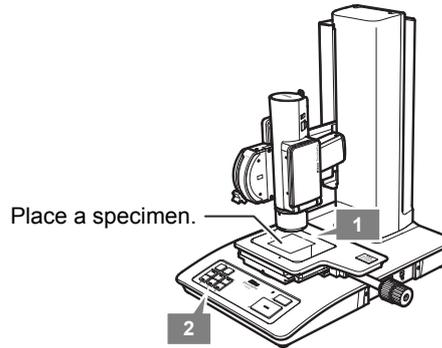
Note: The 3D image generation data is used to analyze the EDF image by the ShuttlePix Editor on the PC.

- 4 Operate the [HDR] submenu and adjust the appearance of the still image.**

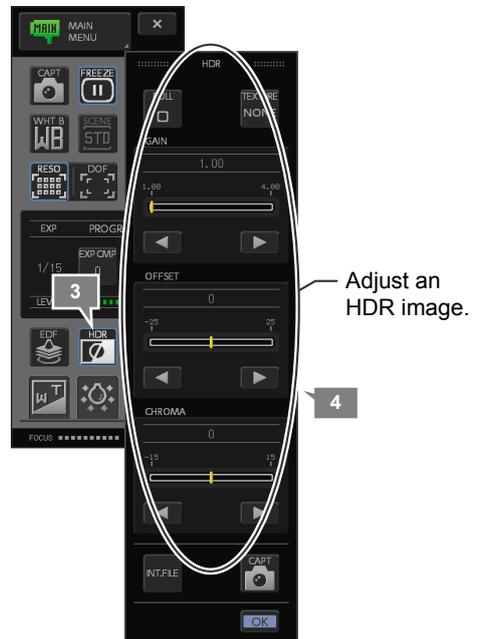
- **[FULL] checkbox**
Switch the FULL mode between on and off. With this mode on, the HDR is adjusted so that all the range from low to high brightness area of the object is displayed.
- **[TEXTURE] button**
Apply texture enhancement effect.
 - **[REVERSE]:** Apply the reverse effect of the texture enhancement so that the texture is not easily noticed.
 - **[NONE]:** Turn off the texture enhancement effect.
 - **[WEAK]:** Apply relatively weak texture enhancement effect.
 - **[STRONG]:** Apply relatively strong texture enhancement effect.
- **[GAIN] slider/adjust button**
Apply gain to the image to narrow the dynamic range.
- **[OFFSET] slider/adjust button**
Adjust the brightness of the image without changing the dynamic range.
- **[CHROMA] slider/adjust button**
Adjust the saturation of the HDR image.

Note: When the settings are changed, the HDR image is updated.

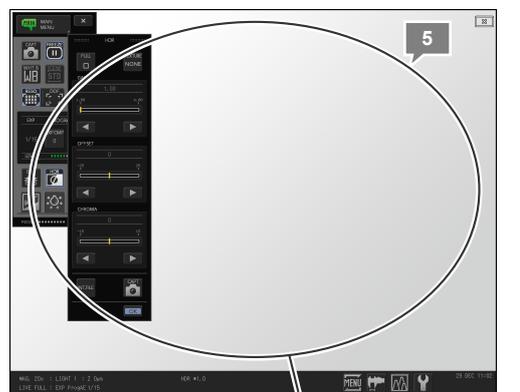
- 5 Check the HDR image state and repeat step 4 until the desired image is obtained.**



Preparing an object



Capturing and adjusting an HDR image



Check the HDR image state.

Checking the HDR image

- 6 To save an intermediate HDR image file, press the [INT.FILE] button.**

The intermediate file is saved in the save folder with an extension of ".HDR".

Note: If an intermediate file is saved, HDR composition can be re-executed by playing the intermediate file in the Playback mode.

- 7 To save the HDR image, press the [CAPT] button.**

- 8 Press the [OK] button to close the [HDR] submenu.**

The HDR image remains on the screen.

Note: Pressing the [CAPT] button in the [MAIN MENU] in this state saves the HDR image.

- 9 To close the still image, press the [HDR] button, the [FREEZE] button, or the [X] button at the upper right corner of the window.**

When the [X] button is pressed, a confirmation message is displayed. Press [YES] to close the image.



The live image returns and the blue frames around the [HDR] and [FREEZE] buttons disappear. The status bar changes from "HDR" to "CAM."



Saving the HDR image



Closing the HDR image

✔ Setting file names

When image files are set to be named manually in capturing, pressing the [CAPT] button or the [INT. FILE] button in the [HDR] submenu displays the [SAVE AS] window. Set the destination folder, file name and image quality (in case of the HDR image), and then press the [SAVE] button to save the file.

(3) Performing the HDR composition using the intermediate file

Save an intermediate file for later HDR image composition by pressing the [INT.FILE] button in the [HDR] submenu. The HDR composition can be started again by playing this file.

1 Open the [VIEW MENU].

Press the [MENU] button on the status bar to display the operation menu. Then press the [MENU SELECT] and press the [PLAY] button in the [VIEW MENU].

2 Play the intermediate file.

When the “.HDR” file is played, the [HDR] submenu opens.

“HDR” is displayed in the middle of the status bar during HDR image playback.

3 Determine the settings for HDR composition in the [HDR] submenu.

Change the preset selection so that the desired image can be obtained.

4 To save the composed HDR image, press the [CAPT] button in the [HDR] submenu.

The HDR image is saved as a new image file.

Note: When an image file is set to be named manually in capturing, pressing the [CAPT] button displays the [SAVE AS] window.

5 Press the [OK] button to close the [HDR] submenu.

The HDR image remains on the screen.

6 To close the still image, press the [X] button at the upper right corner of the window.

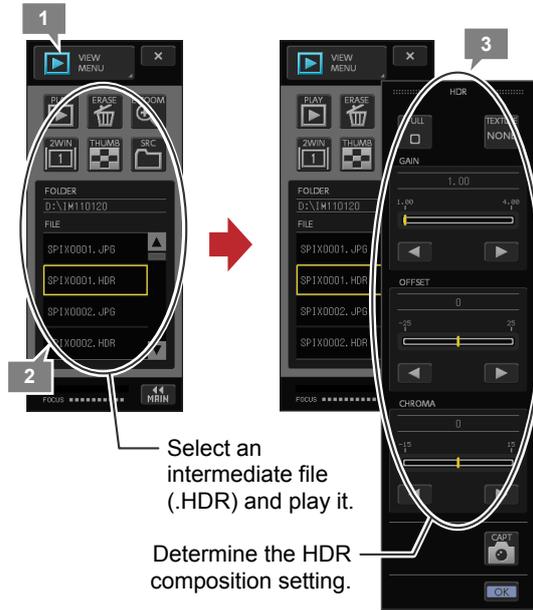
When the [X] button is pressed, a confirmation message is displayed. Press [YES] to close the image.



The live image returns and the display in the middle of the status bar changes from [HDR] to [CAM].

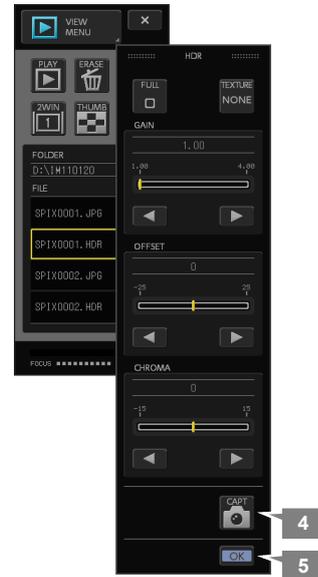
✔ Intermediate file operation

A new intermediate file cannot be created when playing the intermediate file for HDR composition.



Select an intermediate file (.HDR) and play it.
Determine the HDR composition setting.

Playing an intermediate file and re-capturing the HDR image



Saving the HDR image



Closing the HDR image

5.5.5 Eliminating Halation

This system enables you to capture a halation-free image with a simple operation.

(1) Halation elimination

Halation elimination is a process to suppress the brightness of extremely-luminous parts by composing an image from multiple shots of an object captured at various exposures similarly to the case of HDR image process. Use this process when a highly reflective object such as a metal or circuit board is captured to lower the brightness of the part which may cause while-out with a normal capturing. The other parts can be captured with a proper exposure.

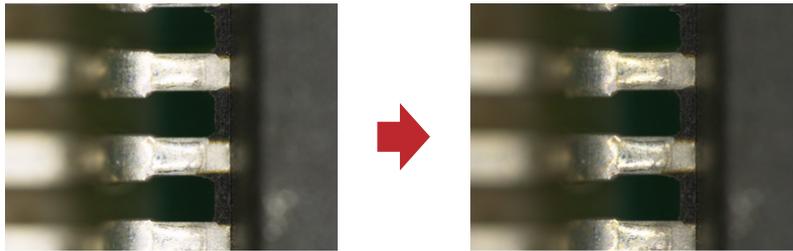


Figure Example of Halation Elimination

✔ Live image of the halation-free image

Elimination of halation is performed with the live image. Because the live image is composed of several frames, the image update speed (frame rate) is slow.

(2) Eliminating the halation during image capturing

To eliminate halation during image capturing, perform the following procedure.

- 1 Place the specimen (object) on the stage.
- 2 Check the live image and make adjustment to obtain a proper view of the object.

Adjust the illumination and zoom magnification and focus the camera on the desired part.

Set image capture conditions such as a scene mode and white balance.

- 3 Press the [HALO] button in the [MAIN MENU] or in the [SUB F] submenu of the [EASY MENU].

The halation-free live image is displayed.

While the halation-free image is displayed, a blue frame appears around the [HALO] button.

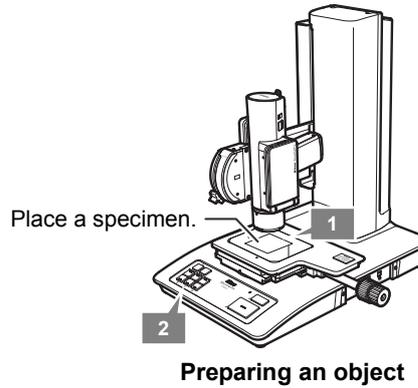
Note: Settings for the scene mode and exposure are restricted during the halation-free image display.

- 4 To capture the shot of the halation-free image, press the [CAPT] button.

Note that the image cannot be saved until the [CAPT] button is pressed.

- 5 To finish the halation elimination process, press the [HALO] button.

The normal live image returns and the blue frame around the [HALO] button disappears.



✔ Names of image files

When image files are set to be named manually in capturing, pressing the [CAPT] button displays the [SAVE AS] window. Set the destination folder, file name and quality of the image to be saved, and then press the [SAVE] button to save the file.

6

Playing Back and Deleting Images

This chapter describes how to play back and delete the captured image.

✔ Handling audio files (when P-400Rv is used)

On the P-400Rv Digital Microscope, a voice memo can be attached to a captured image and an audio file with the same name as the image file (WAV file) can be saved.

When using the P-400Rv with the P-MFSC attached, the following restrictions apply:

- Audio files cannot be played back.
- Audio files cannot be deleted or transferred individually.
- When an image file with an audio file attached is deleted, the audio file is also deleted.

6.1 Setting in the VIEW MENU

Displaying the VIEW MENU

- 1 Press the [MENU] button on the status bar.

The operation menu appears at the upper left (or right) corner.



- 2 Press the [MENU SELECT] button on the operation menu.

The [MENU] submenu appears.



- 3 Press the [VIEW] button.

The name of the operation menu changes to the [VIEW MENU].

VIEW MENU

Items on the VIEW MENU

[MENU SELECT] button
The name of the current menu is shown. Use this button to display the submenu, allowing you to switch between menus.

[X] (close) button
Close the menu.

[PLAY] button
Play an image selected from the [FILE] list.

[ERASE] button
Delete an image selected from the [FILE] list.

[E ZOOM] button
Magnify the image being played back. This button enables you to change the magnification and position to display.

[2WIN] button
Divide the screen to right and left windows to display both the still image and the live image at the same time.

[SRC] button
Select a recording medium and a folder of the image to be played back.

[FOLDER] area
The path to the selected folder is indicated.

[THUMB] button
Display images within the playback folder in the thumbnail window. Up to nine reduced images are displayed in the window at a time.

[FILE] list
The files within the selected folder are indicated.

[FOCUS] indicator
Indicates the focus of the live image.

[MAIN] button
Return to the [MAIN MENU].

6.2 Playing Back an Image

This section describes how to play back the image captured and saved onto the recording medium and display it on the touch panel monitor.

Available recording medium

This system can play back only the images saved onto the recording medium (USB memory or SD card) connected to the system. Images on the FTP server cannot be played back.

6.2.1 Playing Back an Image

To play the image, perform the following procedure.

1 Open the [VIEW MENU].

Information on the folder set as a destination folder of the image is displayed in the [FOLDER] display area and the [FILE] list.

2 To switch the folder of the image to be played back, press the [SRC] button and select the desired drive (recording medium) and folder.

When the [SRC] button is pressed, the [PLAYBACK FOLDER] submenu appears.

Select a drive select button (D to G) on the upper part of the submenu to specify a drive.

- **D to F:** USB memory
- **G:** SD card

When a drive is selected, all the folders in that drive are displayed in the folder list. The list corresponds to the folder hierarchy. When a folder is selected, the list of the items included in the folder is displayed.

Press the [OK] button to determine the drive and folder. The submenu closes.

The selected folder path and a list of files contained in the folder are displayed in the [VIEW MENU].

Note: Up to the 7th folder from the root folder are available for the source folder selection.

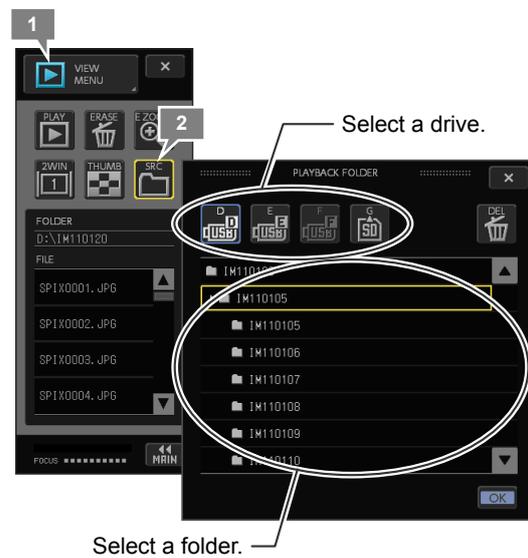
3 Select an image file from the list.

The selected file is marked with a yellow frame.

4 Press the [PLAY] button.

The selected image appears on the touch panel monitor.

“VIEW” is displayed in the middle of the status bar during image playback.



Selecting a playback folder



Selecting and playing back an image file

5 To change the image, repeat steps 3 and 4.

To play the image saved onto another drive or folder, repeat the procedure from step 2.

6 To close the image, press the [X] button at the upper right corner of the window.

The live image returns and the display in the middle of the status bar changes from [VIEW] to [CAM].



Playback (view) window

6

Playing Back and Deleting Images

✔ Playback folder setting

Shifting to the operation menu other than the [VIEW MENU] resets the VIEW folder settings and the folder same as the destination folder is set. When the [VIEW MENU] is opened, the information on the folder set as the destination is always displayed.

✔ Using another menu while playing back an image

When the [MENU SELECT] button in the [VIEW MENU] is pressed while playing back an image, the operation menu can be switched with the image still on the screen. To stop the image playback, press the [X] button at the upper right corner of the screen.

- When the menu is switched to the [MAIN MENU], the [FREEZE] button is selected (a blue frame is displayed). Press the button to release the still image state. The image playback stops.
- Since the operation to change a scene mode is restricted while the image is being played back, when the [MAIN MENU] or [EASY MENU] is displayed while the image is being played back, the [SCENE] button cannot be selected.

✔ Capturing a playback image

An image being played back can be captured by pressing the [CAPT] or [CAPTURE] button.

- An annotation can be added and simplified measurement can be applied to the playback image (See "7 Using Annotation and Simplified Measurement"). Images can be captured including the annotation and measurement results.
- When a playback image that has been taken by the ShuttlePix (this system or a stand-alone P-400Rv/P-400R) is captured, it is saved with the original image size. If capturing a playback image that has been taken by a device other than ShuttlePix, it is saved in 1280x960 size.

6.2.2 Displaying Thumbnail Images

Select a saved image from the thumbnail list which displays up to nine reduced images at a time.

1 Open the [VIEW MENU].

Change the playback folder as required.

2 Press the [THUMB] button.

The thumbnail window opens and displays the images within the selected folder as thumbnails.

Nine thumbnail images are displayed in the window at a time.

To return to the [VIEW MENU], press the [X] button at the upper right corner of the thumbnail window.

3 Press the page switching button at the lower left of the window, if necessary, to change the thumbnail page.

If the folder contains more than nine images, use the page switching buttons to change the thumbnail page.

4 Select the thumbnail of an image to be played.

The selected thumbnail is marked with a yellow frame.

5 Press the [PLAY] button.

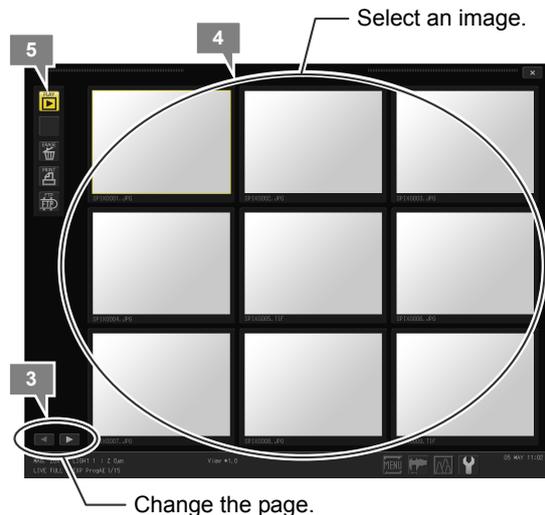
The selected image appears on the touch panel monitor.

6 To close the image, press the [X] button at the upper right corner of the window.

The live image returns.



Displaying the thumbnail window



Thumbnail window

6

Playing Back and Deleting Images

Operating the thumbnail window

On the left of the thumbnail window, the [PLAY], [ERASE], [PRINT], and [FTP] buttons are displayed. These buttons allow you to perform the corresponding operations.

- **[PLAY] button:** Plays the selected image.
- **[ERASE] button:** Deletes the selected image. To delete images, the [ERASE] button can be pressed while multiple images are selected.
- **[PRINT] button:** Prints the selected image. See “9 Direct Printing” for details about the print function.
- **[FTP] button:** Transfers the selected image to the FTP server. See “11.4 Transferring Image to FTP Server” for details about the FTP function.

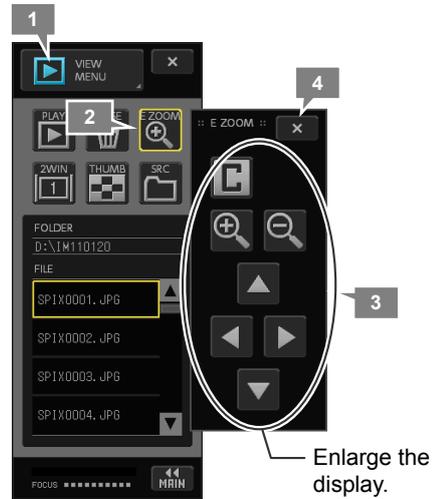


Buttons in the thumbnail window

6.2.3 Enlarging an Image

Enlarge the playback image by using the electronic zoom function.

- 1** Open the [VIEW MENU] and play an arbitrary image.
- 2** Press the [E ZOOM] button.
The [E ZOOM] submenu appears.
- 3** In the [E ZOOM] submenu, enlarge the playback image on the screen.
The magnification of the electronic zoom is indicated in the middle of the status bar.
 - **Changing the display magnification**
Change the display magnification using the [+] and [-] buttons.
 - **Moving the display position**
Move the display position using the up, down, right, and left arrow buttons.
 - **Canceling the enlarged display**
Cancel the enlarged display by pressing the [C] button.
- 4** To close the [E ZOOM] submenu, press the [X] button of the submenu.



Enlarging the playback image (electronic zoom)



Displaying electronic magnification

6.2.4 Displaying the Still Image and the Live Image in Two Windows

Divide the screen into two windows (the right and left windows) and display both the still image and the live image in the two windows at the same time, respectively.

This function is useful when comparing the live image with the saved image.

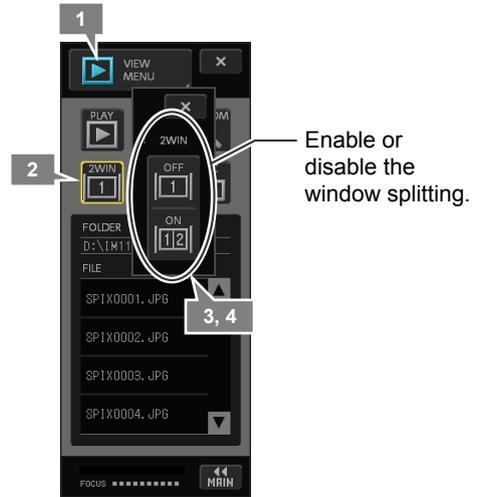
1 Open the [VIEW MENU] and play an arbitrary image.

2 Press the [2WIN] button.

The [2WIN] submenu appears.

3 To divide the screen, press the [ON] button.

The screen is divided into the right and left windows. The left window displays the playback image and the right window shows the live image.

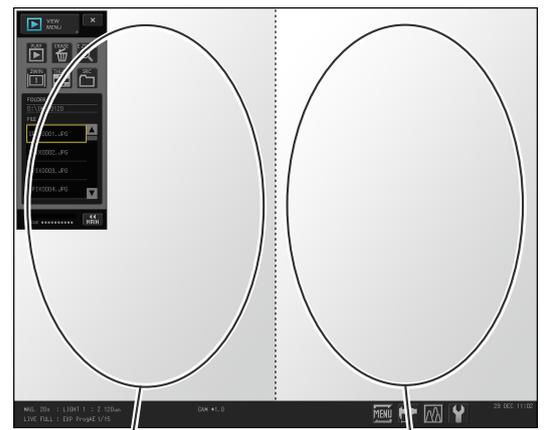


Window splitting

✓ Moving the display position of the image

The center areas of the still and live images are displayed on the right and left split screen respectively. When pressing the edge of each split screen on the touch panel monitor, the image is slid to the side and the hidden image can be seen.

4 To quite the split windows, press the [2WIN] button to show the [2WIN] submenu again, and press the [OFF] button.



Split display

✓ Operation when dividing the screen into two

When [ON] is selected in the [2WIN] submenu, the display screen is divided into two.

- When a still image is shown on the screen, the still image is displayed on the left side of the divided screen. When a live image is shown on the screen, the frozen image is displayed on the left side of the divided screen.
- The live image is displayed on the right side of the divided screen. The live and still images can be switched by pressing the [FREEZE] button in the [MAIN MENU].
- When playing back an image while the divided screen is displayed, the playback image is displayed on the left side of the divided screen.
- The operation to change a scene mode is restricted while the divided screen is displayed. The [SCENE] button cannot be selected if the [MAIN MENU] or [EASY MENU] is displayed.

6.3 Deleting an Image

Delete an image in the [VIEW MENU]. Images can be deleted in one of the following three methods.

- **Deleting an Image from the Folder**
- **Selecting an Image from the Thumbnail Window to Delete It**
- **Deleting a Folder and All Images Inside It**

❗ Deleting images

The image once deleted cannot be restored any more. Be careful not to delete important images by mistake. It is recommended that important images be transferred to the personal computer, etc. and saved.

When checking the content of the recorded medium on the personal computer, the property of each image can be changed to “Read Only.” Images with “Read Only” property cannot be deleted by the operation of this system. If an attempt is made to delete such images, a warning message appears.

✔ Deleting an audio file (when the P-400Rv is used)

When a stand-alone P-400Rv Digital Microscope is used, a voice memo can be attached to the image. When the P-400Rv is used with the P-MFSC attached, audio files cannot be deleted or transferred individually. In addition, when an image file with an audio file attached is deleted, the audio file is also deleted.

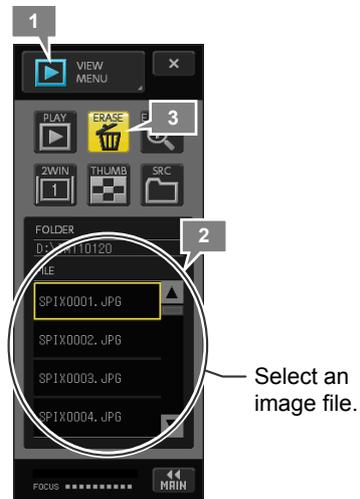
6.3.1 Deleting an Image from the Folder

To delete an image saved in the playback folder separately, perform the following procedure.

- 1 Open the [VIEW MENU].**
- 2 Select an image to be deleted from the list.**
- 3 Press the [ERASE] button.**
A confirmation message for deletion appears.
- 4 Press the [YES] button to delete the image, or the [NO] button to cancel the selection.**

When [YES] is selected, the image is deleted and the [FILE] list is updated.

When the image being played on the screen is deleted, the live image returns.



Deleting an image file



Confirmation for deletion

❗ The case where an image cannot be deleted

An image cannot be deleted when the recording medium is locked or the image is set as “Read-Only.” A warning message appears in such cases.

6.3.2 Selecting an Image from the Thumbnail Window to Delete It

To select and delete an image from the thumbnail list, perform the following procedure.

1 In the [VIEW MENU], select a playback folder.

2 Press the [THUMB] button.

The thumbnail window opens and displays the images within the selected folder as thumbnails.

3 Select an image to be deleted from the thumbnail window.

The selected image is marked with a yellow frame.

4 Press the [ERASE] button.

A confirmation message for deletion appears.

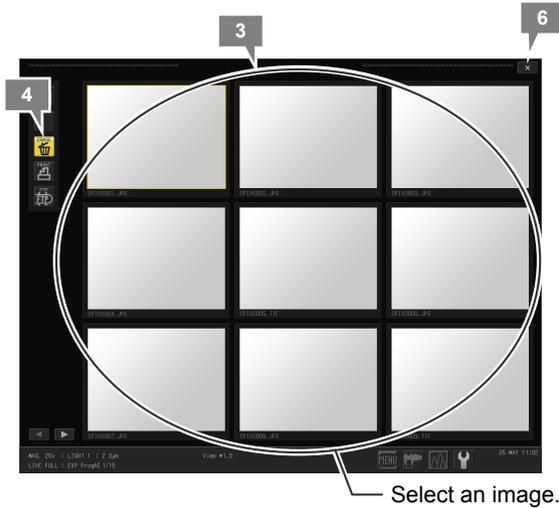
5 Press the [YES] button to delete the image or the [NO] button to cancel the selection.

When [YES] is selected, the image is deleted. The thumbnail window is updated and the deleted image is displayed in gray in the thumbnail window.

6 To return to the [VIEW MENU], press the [X] button at the upper right corner of the window.



Displaying the thumbnail window



Thumbnail window



Confirmation for deletion

6

Playing Back and Deleting Images

! The case where an image cannot be deleted

An image cannot be deleted when the recording medium is locked or the image is set as "Read-Only." A warning message appears in such cases.

6.3.3 Deleting a Folder and All Images Inside It

To delete all images and the folder containing them, perform the following procedure.

- 1 Display the [VIEW MENU].**
- 2 Press the [SRC] button.**
The [PLAYBACK FOLDER] submenu appears.
- 3 Select the drive (recording medium) that contains a folder to be deleted and select the folder.**

Use a [DRIVE SELECT] button (D to G) on the upper part of the submenu to select a drive.

- **D to F:** USB memory
- **G:** SD card

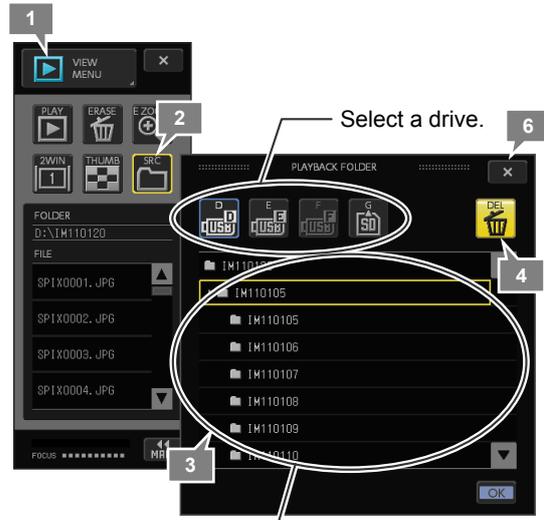
When a drive is selected, all the folders in that drive are displayed in the folder list.

Select a folder to be deleted.

- 4 Press the [DEL] button.**
A confirmation for deletion message appears.
- 5 Press the [YES] button to delete the folder or the [NO] button to cancel the selection.**

When [YES] is selected, the folder is deleted and the folder list is updated.

- 6 Press the [X] button to close the submenu.**



Select a folder.

Deleting a folder



Confirmation for deletion

! The case where an image cannot be deleted

A confirmation message appears in the following cases:

- A folder cannot be deleted when the recording medium is locked or the folder is set as "Read-Only."
- If the selected folder contains a "Read-Only" image file, the folder and the image file are not deleted. However, the other image files are deleted.

7

Using Annotation and Simplified Measurement

This chapter describes how to add an annotation to an image and perform simplified measurement on the image.

7.1 Before Use

The following functions that are applied to the images are available in this system.

- **Annotation**

Annotations can be added to a live or playback image. Annotations include arbitrary text and marker (number) among others. Use the [TOOL] operation menu to add annotations.

- **Simplified Measurement**

Length, angle or diameter of an object on a live or playback image can be measured in a simple manner. Use the [TOOL BAR] dedicated for this purpose.

7.1.1 Notes about Annotation and Simplified Measurement

! Notes about annotation and simplified measurement

Note the following when using annotation and simplified measurement.

- **Calibration**

Be sure to check the calibration setting before measuring an object using the annotation or simplified measurement function. This system has two settings for calibration: [STD] and [USER].

- When [STD] is selected, the measurement criteria calculated from the optical zoom magnification is used.
- When measuring an object with arbitrary criteria, perform calibration and then select [USER].

- **Precision**

Precision of this system's simplified measurement is not high.

- **Zooming**

If the optical zoom magnification of a live image is changed, existing annotation results are redrawn and their numerical values change in accordance with the scale of the screen. However, all the results of simplified measurement are deleted. (For electronic zooming, both annotations and measurement results are scaled.)

Executing annotation and simplified measurement

Annotation and simplified measurement can be applied to both live and playback images.

- **Live image**

Annotation can be added and simplified measurement can be performed for a live image being observed. The annotation and measurement results can be saved when the image is captured.

- **Playback image**

Annotation can be added and simplified measurement can be performed for a captured image. The annotation and measurement results can be saved when the [CAPT] or [CAPTURE] button is pressed again.

Saving the results

The executed results of annotation and simplified measurement can be saved in the following way. Use the [TOOL SET: MAIN] window for configuring settings related to saving. See “7.2.2 Configuring basic annotation settings” for details.

- **Pasting to an image ([PASTE TO IMAGE] area)**

Annotation or measurement results can be pasted (or embedded) in an image when captured. The results saved with this method cannot be deleted or edited. They always appear when the image is played back.

- **Saving in a tool file ([T FILE] checkbox)**

The results can be saved to a special file with an extension of “.msr” for editing by a dedicated application called “ShuttlePix Editor” on a PC later. Annotation or measurement results are not shown in normal playback. They appear when the file is read into the ShuttlePix Editor. The ShuttlePix Editor can edit, add or delete the annotation or measurement results.

- **No saving**

When pasting to the screen and saving to a tool file are disabled, no annotation or measurement results are saved and the playback image will contain no results.

❗ Pasting the results

You cannot remove only results from an image to which annotation and measurement results are pasted when capturing.

7.1.2 **Overlay**

Some annotations and simplified measurement drawings are written into “overlay.”

(1) Overview of overlay

An overlay is like a transparent sheet covered on a shot image.

Some annotations (text, straight line, pen and marker) and simplified measurement results are rendered on an overlay. An overlay can be hidden to temporarily hide the rendered results or can be shown to make all the results appear at once.

By using an overlay, an annotation can be added and measurement can be performed without modifying an original image.

Drawing rendered in an overlay can be saved with an image when captured or printed using the direct printing feature.

✔ Content of overlay

- All results of simplified measurement are rendered in an overlay.
- Of annotation results, text, straight line, pen and marker are drawn on an overlay.
XY measurement, cross scale, scale, crosshairs and grid line are not drawn on an overlay. Each of these items can be independently displayed or hidden.

7

Using Annotation and Simplified Measurement

(2) Using overlay

Displaying and hiding an overlay

Show or hide an overlay using the [OVRLY] button in the [TOOL BAR] of the [TOOL MENU].

- 1 Display the [TOOL MENU] or [TOOLBAR].**
- 2 Press the [OVRLY] button.**
The [OVERLAY] submenu appears.
- 3 Press the [ON] button to show or the [OFF] button to hide the overlay.**



Showing/hiding the overlay

✔ Automatic display of overlay

Even when an overlay is hidden, it automatically appears when a button in the [TOOL MENU] or [TOOL BAR] that will draw something on the overlay is pressed.

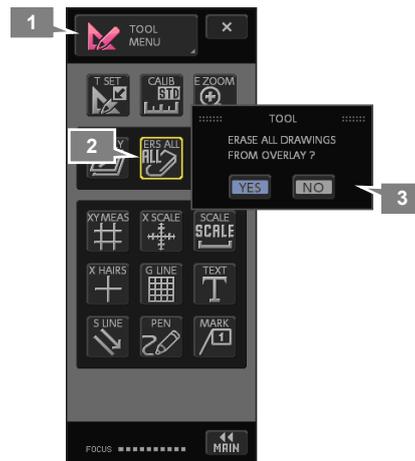
✔ Showing and hiding annotations

Among annotations, XY measurement, cross scale, scale, crosshairs and grid line can independently be set to show up or be hidden.

Clearing all overlay content

Clear overlay content in one operation.

- 1** Display the [TOOL MENU] or [TOOLBAR].
Press the [SHOW ALL] button if using the [TOOLBAR].
- 2** Press the [ERS ALL] button.
A confirmation message appears.
- 3** Press the [YES] button to erase all or the [NO] button to cancel the selection.
Information rendered in the overlay is cleared.



Clearing all overlay content

✓ Clearing all overlay

- The content will not be restored once cleared.
- Among annotations, XY measurement, cross scale, scale, crosshairs and grid line can independently be set to show up or be hidden. These are not deleted by the erase-all operation.
- When the [ERS ALL] button is pressed, rendered contents except annotations listed above are erased. You cannot keep only a part of the overlay with this button. To erase each content ([TEXT], [S LINE], [PEN], [MARK]) in overlay, press the [ERASE] or the [UNDO] button on each menu.

7.1.3 Configuring Units and Calibration

In order to display measurement and scale on the screen, it is important to configure unit and reference of length.

✔ Configuring unit and calibration

Unit and calibration settings are commonly used in annotation and simplified measurement.

- Unit is configured in the [TOOL SET: MAIN] window.
- Calibration is registered in the [TOOL SET: CALIB] window. Calibration values can be selected in the [TOOL MENU] or [TOOLBAR]. If calibration is modified in one menu, the values in the other menu also change.

(1) Switching unit settings

Unit, or reference of length, can be selected from five types: μm , mm, cm, mil or inch.

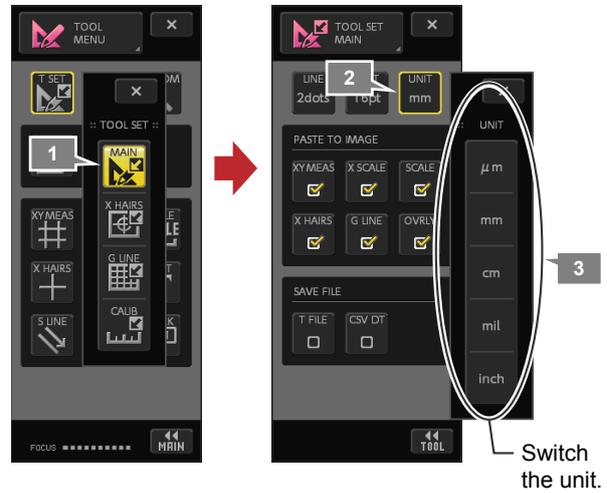
1 Display the [TOOL SET: MAIN] window.

Open the Tool menu, press the [T SET] button and press the [MAIN] button in the sub menu.

2 Press the [UNIT] button and select a unit to use from the submenu.

- **Unit: mm (initial setting)**
Select from the five units: μm , mm, cm, mil and inch

3 To return to the [TOOL MENU], press the [← TOOL] button. To close the [TOOL SETUP] window, press the [X] button.



Switching the unit

⚠ Switching the unit and overlay information

If the unit is switched, the results of annotation and simplified measurement are as follows:

- XY measurement, cross scale, scale and concentric circle annotations are updated in accordance with the unit setting.
- The unit of the simplified measurement results is changed.

(2) Switching calibration settings

Calibration is to set a reference of length.

This system provides two types of calibration settings: “standard” and “user.” Switch to either of them.

1 Display the [TOOL MENU] or [TOOLBAR].

2 Press the [CALIB] button.

The [CALIB] submenu appears.

3 Select [STD] or [USER].

- **Standard calibration**

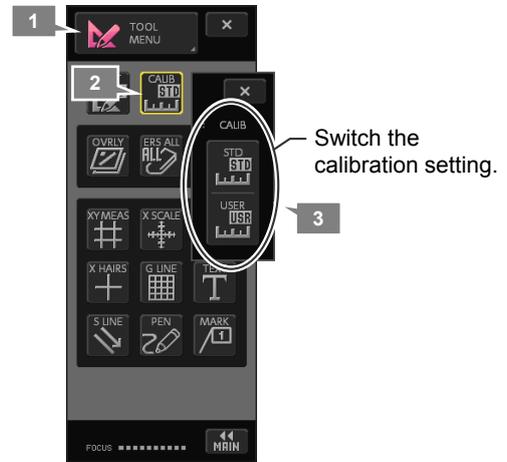
The measurement criteria calculated from the optical zoom magnification.

- **User setting calibration**

Use this when measuring an object with arbitrary criteria.

When [USER] is selected, it is necessary to perform calibration.

The comment entered at the time of registration is displayed on the tooltip of the [USER] button.



Switching calibration setting

! Calibration settings and overlay information

If the calibration setting is switched, the results of annotation and simplified measurement are treated as follows:

- XY measurement, cross scale, scale and concentric circle annotations are updated in accordance with the calibration value.
- Simplified measurement results are completely cleared.

✓ User-configured calibration values

- In order to use user-configured calibration values, it is necessary to perform calibration to register the user settings beforehand. See “7.2.2 Registering user-configured calibration values” for details.
- If no calibration value of the user setting is registered, the setting of “user” is the same as that of “standard.”

7.2 Adding Lines and Comments to an Image

- Tool Menu Operations -

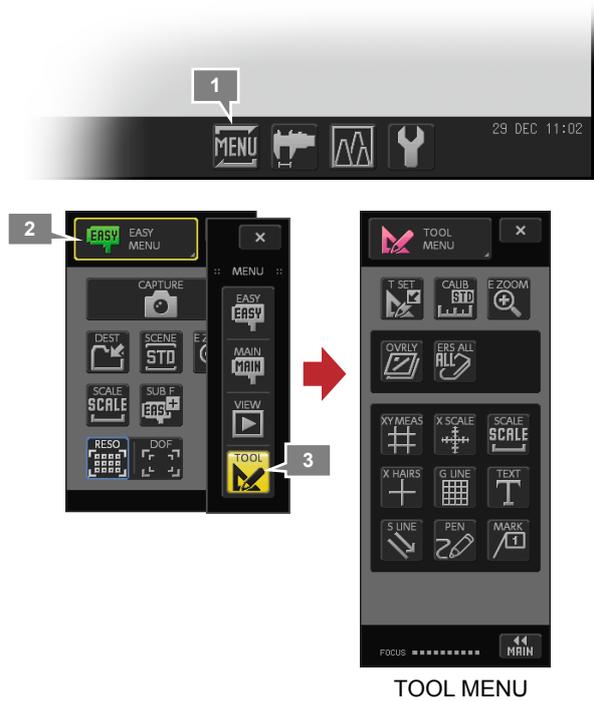
Annotation can be added through the tool menu. The following functions are available.

Item	Description	See
XY Measurement	Two cross lines are displayed on the screen. Horizontal (X) and vertical (Y) distance can be measured.	p.153
Cross scales display	Horizontal (X) and vertical (Y) scales are displayed on the screen. Approximate size of an object can be measured.	p.154
Scale display	A scale is displayed at the bottom right of the screen. Approximate size of an object can be measured.	p.155
Crosshairs with circle display	Crosshairs with concentric circles are displayed at the center of the screen. Center, horizontal side or vertical side of an object can be adjusted. Settings of crosshairs and circles can be changed as required (in the [TOOL SET: X HAIRS] window).	p.156
Grid line display	Grid lines can be displayed on the screen. Distance between grid lines can be arbitrarily specified with a numeric value or by two points on the screen (in the [TOOL SET: G LINE] window).	p.158
Text comment	An alphanumeric text comment can be added to an arbitrary location of the screen.	p.159
Straight lines and arrows	A straight line or arrow can be drawn on the screen.	p.160
Pen drawing	Any line can be drawn on the screen by stylus.	p.161
Counting with numbered marker	A marker with a number can be drawn on an arbitrary location of the screen. Points on the screen can be numbered with markers.	p.162

7

7.2.1 Displaying the Tool Menu

- 1 Press the [MENU] button on the status bar.**
An operation menu appears on the top left (or top right) of the screen.
- 2 Press the [MENU SELECT] button in the operation menu.**
The [MENU] submenu appears.
- 3 Press the [TOOL] button.**
The operation menu switches to [TOOL MENU].



Switching the TOOL menu location

If the [MENU] button on the status bar is pressed while the TOOL menu is displayed on the screen, the location of the TOOL menu switches from right to left or vice versa. If the [MENU] button is pressed while both the tool menu and toolbar are displayed, location of them will be swapped from right to left or vice versa.

Items on the TOOL menu

[MENU SELECT] button
Name of the menu is displayed on this button. When this button is pressed, submenu appears. Switch the menu using this button.

[X] (Close) button
Close the menu.

[T SET] button
Configure annotation and simplified measurement. When this button is pressed, the [TOOL SET] button appears. A menu on the submenu can be selected.

[CALIB] button
Switch the standard and user calibration setup.

[E ZOOM] button
Enlarge the screen. Zoom magnification and location can be changed.

[OVRLY] button
Show or hide overlay.

[ERS ALL] button
Clear the entire overlay content. XY measurement, cross scale, scale, crosshairs and circles and grid line are not erased.

Annotation buttons
These are for XY scale, cross scale, scale, crosshairs, grid lines, text, straight line, pen and marker.

[FOCUS] indicator
Display the focus of a live image.

[← MAIN] button
Return to the main menu.

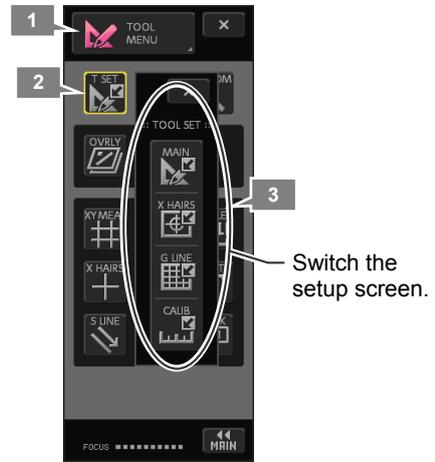
7.2.2 Changing Annotation and Simplified Measurement Settings

Annotation and simplified measurement can be configured using the [T SET] button on the tool menu.

- 1 Display the [TOOL MENU].**
- 2 Press the [T SET] button.**
The [TOOL SET] button appears.
- 3 Press a desired button in the [TOOL SET] submenu to show a desired setup window.**

The window changes as you select:

- **Main:** [TOOL SET: MAIN] window
- **Crosshairs:** [TOOL SET: X HAIRS] window
- **Grid Line:** [TOOL SET: G LINE] window
- **Calibration:** [TOOL SET: CALIB] window



Switching setup window

Use the [MENU SELECT] button on each screen on the [TOOL SET] to switch to another window.

- 4 Configure settings in each window.**
Press the [SAVE] button to save the settings if there is.
Content of the setting for each window is described in the following pages.
- 5 Press the [◀ TOOL] button to return to the [TOOL MENU]. Press the [X] button to close the [T SET] window.**

TOOL setup windows

■ **TOOL SET: MAIN**



Configures basic settings as well as saving settings with tool files or CSV files.

■ **TOOL SET: X HAIRS**



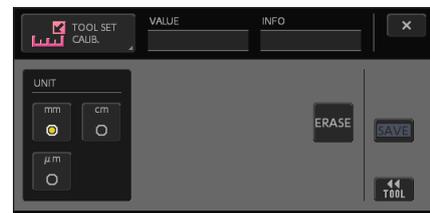
Sets Crosshairs and circles.

■ **TOOL SET: GRID LINE**



Sets up how to draw grid lines and draws grid lines.

■ **TOOL SET: CALIB**



Registers calibration values.

(1) Configuring basic annotation settings

The following settings can be done in the [TOOL SET: MAIN] window.

- **[LINE] button (line width)**

Set the line width used in annotation and measurement. Select one of three line widths: [1dot], [2dots] or [3dots]. Changing this setting does not affect lines already drawn by the Straight Line and Pen tool.

- **[TEXT] button**

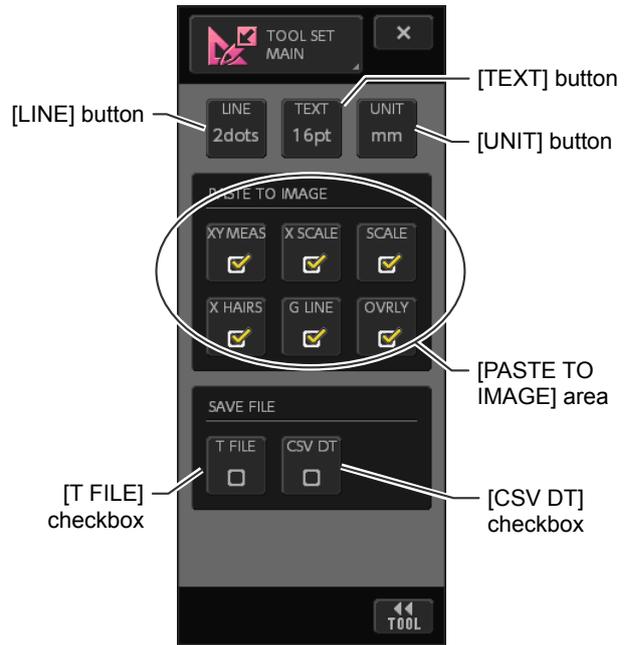
Set the text size used in annotation and measurement. Select from the three sizes: [12pt], [16pt] or [24pt]. Changing this setting does not affect text already drawn by the Text and Count Marker tool.

- **[UNIT] button**

Set unit used in annotation and measurement. Select from five units: [μ m], [mm], [cm], [mil] or [inch].

- **[PASTE TO IMAGE] area**

Select what information will be added to an image when shot. Select or clear the six checkboxes: [XY MEAS], [X SCALE], [SCALE], [X HAIRS], [G LINE] and [OVRLY]. These settings are also applied to printing and obtaining a live image on the web screen.



[TOOL SET: MAIN] window

✔ **Adding annotations and measurement results**

Annotations and simplified measurement results added to an image cannot be deleted later.

✔ **Image size setting**

If the image size for the image to be saved is set to 0.5 M (800x600) and it is saved in JPEG format, a vertical line of the lines or text to be attached may not be displayed properly. Set a large value for the line width and text size when adding annotations and measurement results to an image of 0.5 M size in JPEG format.

- **[T FILE] checkbox (tool file)**

Specify whether to save annotation and measurement results to a file for editing by the ShuttlePix Editor.

If the checkbox is selected, annotation and measurement results added when an image is shot are saved to the “tool file.” The file will have the same name as the image and an extension of “.msr.”

✔ **Tool file usage**

Use a tool file for editing an image with a dedicated application “ShuttlePix Editor” on a PC.

If it is configured to save tool files, annotations and measurement results are saved to a tool file when an image is shot. If the image and tool files are read into the ShuttlePix Editor, annotations and measurement results can be merged, edited, added or deleted in the application.

- **[CSV DT] checkbox (save to CSV)**

Specify whether to save measurement results to a CSV file. Selecting the checkbox automatically saves the measurement results to a CSV file when an image is saved. The file will have the same name as the image and an extension of “.csv.” Annotation information will not be saved to the CSV file.

Note: A CSV file can be saved by pressing the [CSV] button on the [TOOLBAR].

CSV file format

A CSV file contains information like the one shown below.

	A	B	C	D	E	F	G
1							
2			Res1	Res2	Res3	Unit	
3	1	Distance between Two Points	3.5			cm	
4	2	Distance between Two Points	0.57			cm	
5	3	Distance between Line & Point	0.96			cm	
6	4	Distance between Line & Point	0.96			cm	
7	5	Distance between Line & Point	1.6			cm	
8	6	Distance between Line & Point	1.9			cm	
9	7	Angle	165			deg.	
10	8	Angle	32			deg.	
11	9	Angle	117			deg.	
12	10	Diameter & Circumference	5.1	16		cm	
13	11	Diameter & Circumference	5.9	18		cm	
14							

Figure: Example of the CSV file

(2) Configuring crosshairs

The following settings can be done in the [TOOL SET: X HAIRS] window.

- **[RADIUS SETTING] area**

Configure concentric circles displayed with crosshairs. When the setting area is pressed, the window changes. Whether to show or hide circles can be selected and each size can be selected from 20 to 360. A circle of the selected size is displayed.

- **[DASHED] checkbox**

Specify whether crosshairs are drawn with solid or dashed lines. When the checkbox is selected, the crosshairs will be drawn in dashed lines. Circles are always drawn in solid lines.

- **[CENTER] checkbox (paint the center)**

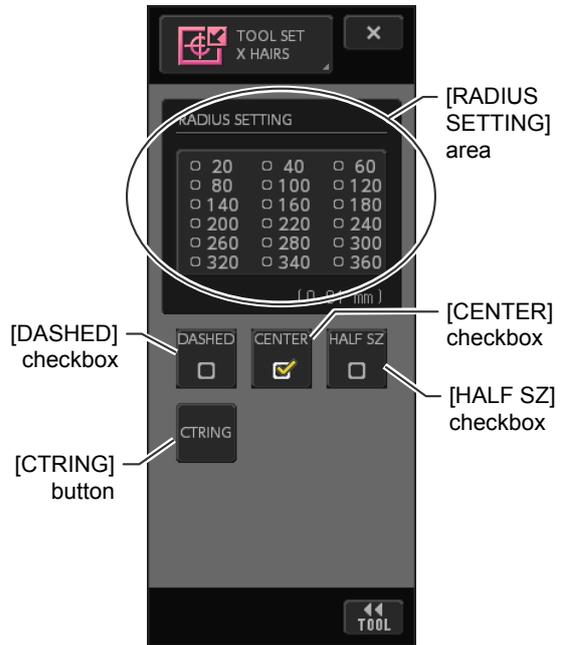
Specify whether to paint the intersection of the crosshairs.

- **[HALF SZ] checkbox (half size)**

Draw crosshairs in half the normal size. The display size of the concentric circle does not change.

- **[CTRING] button (centering)**

Restore the crosshairs to the center after it is moved.



[TOOL SET: X HAIRS] window

(3) Configuring how grid lines are drawn

The [TOOL SET: G LINE] window is used to specify how grid lines are drawn.

- **[MODE] area**

Specify how grid lines are drawn. Select [DIRECT CLICK] or [INPUT VALUE] by pressing either button.

- **[DIRECT CLICK]**

Specify two points on the screen. Grid lines are drawn based on the width and height between the two points. The minimum distance is 20 pixels.

To redraw grid lines, press the [ERASE] button to clear the grid lines and specify the two points again.

- **[INPUT VALUE]**

Enter the width and height numerically. Select the reference point from [TOPLEFT] and [CENTER].

- **[ERASE] button**

Clear the settings of the grid lines. This button appears only when [DIRECT CLICK] is selected.

- **[WIDTH] input field**

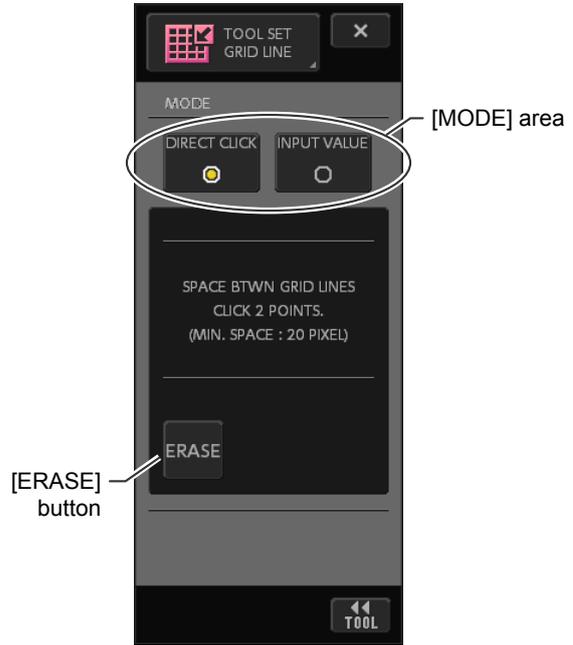
Enter a numerical value for distance between vertical grid lines. Press the input field; the keypad appears. This field appears when [INPUT VALUE] is selected.

- **[HEIGHT] input field**

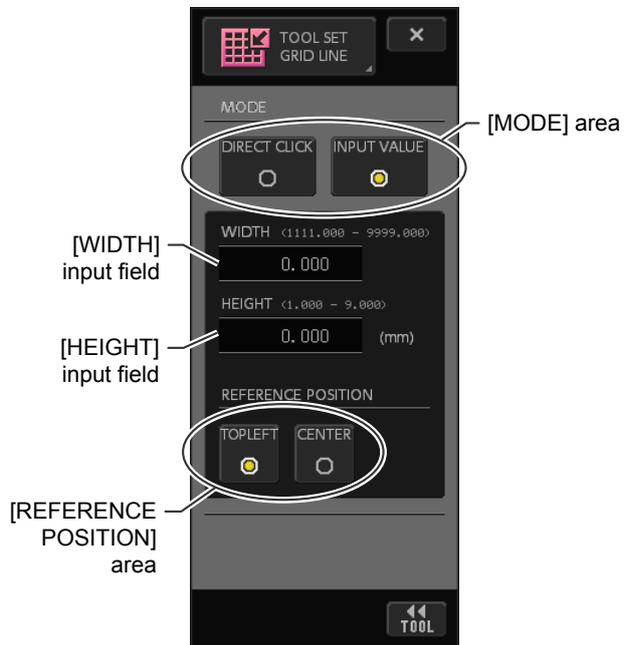
Enter a numerical value for distance between horizontal grid lines. Press the input field. The keypad appears. This field appears when [INPUT VALUE] is selected.

- **[REFERENCE POSITION] area**

Select the reference point of grid lines from [TOPLEFT] or [CENTER]. This area appears when [INPUT VALUE] is selected



[TOOL SET: G LINE] window (Setting by clicking)



[TOOL SET: G LINE] window (Numerical input)

(4) Registering user-configured calibration values

Calibration values (user-configured values) can be registered in the [TOOL SET: CALIB] window.

☑ Switching calibration values

There are two types of calibration settings in this system: [STD] and [USER]. The value calculated from the optical zoom magnification is registered in [STD]. When using an arbitrary calibration value, use [USER].

Required object

Use the following object for the operations described below.

- Object of known length

Follow the procedures described below to register a user-configured calibration value.

1 Place an object of known length on the stage, and adjust its location so that the object is seen as a live image.

2 Adjust zoom magnification so that the object is displayed in an appropriate size. Adjust illumination and focus.

3 Display the [TOOL SET: CALIB] window.

Press the [T SET] button and press the [CALIB] button on the submenu.

4 Draw a calibration line on the screen along the object. See the line drawn from (A) to (B) in the figure.

Specify the start and end points. A line is drawn between them. To retry, press the [ERASE] button and redraw the line.

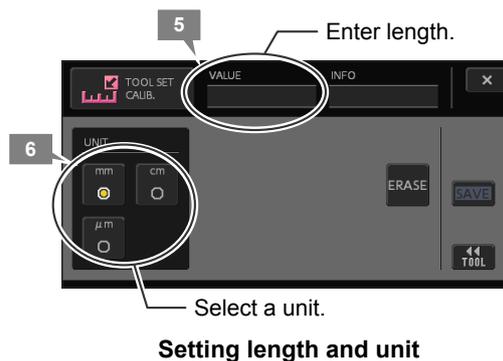
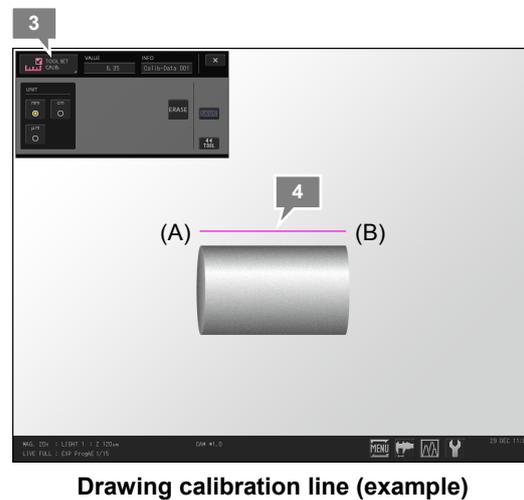
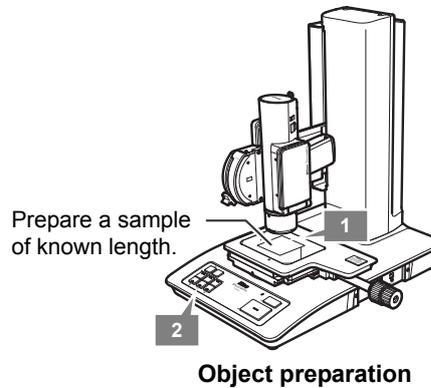
5 Enter the length of the object in the input field of the [VALUE] area.

Select the input field of the [VALUE] area. The keypad appears. Press the desired key to enter a correct value and press the [ENTER] button.

Press the [CLR] button to erase the input. Press the [BS] button to backspace one character. Pressing the [X] button closes the keypad without changing the value.

6 Set the unit of the length in the [UNIT] area.

Select a unit from the option buttons ([mm], [cm] or [μ m]).



- 7** Enter a comment (maximum 16 characters) into the input field of the [INFO] area as required.

When the input field is pressed, the keypad appears. Press keys to enter information and press [ENTER] to finish input.

A comment entered is displayed as a tooltip when [USER] is selected.



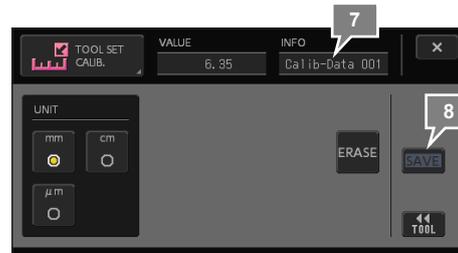
Keypad for entering comment

- 8** Register the settings using the [SAVE] button.

Settings cannot be saved without entering the calibration line and unit.

- 9** Press the [◀ TOOL] button to return to the [TOOL MENU]. Press the [X] button to close the [TOOL SET: CALIB] window.

The settings are discarded if calibration values are not saved.



Registering calibration settings

7

Using Annotation and Simplified Measurement

7.2.3 Placing Lines and Adding Comments on the Screen

Add annotations such as lines and comments to the screen using features such as pen, count marking, text, and free and straight lines.

✔ When adding annotations to the live image

When adding an annotation to a live image, the image and annotation may be misaligned depending on the object state. Take a still image using the [FREEZE] button, and then add an annotation.

(1) Performing XY measurement

1 Display the [TOOL MENU].

2 Press the [XY MEAS] button.

The [XY MEAS] menu appears and measurement lines are displayed on the screen.

Distance between vertical measurement lines (length along X direction) and distance between horizontal measurement lines (length along Y direction) are displayed at the intersection of the lines.

3 Press the [COLOR] button to select color of the lines.

Line color can be changed later.

4 Move the measurement lines to a desired location.

1 Select the intersection or a line.

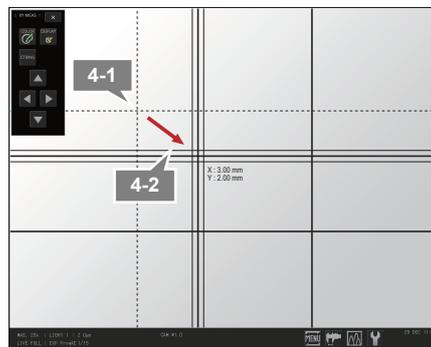
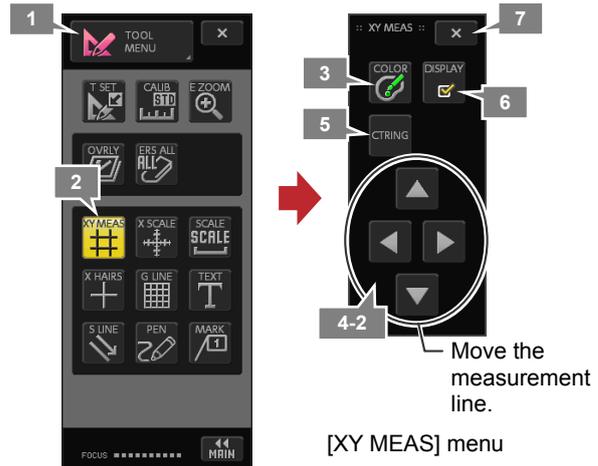
Guiding lines appear at both sides of the line.

2 Move the measurement line on the screen using the stylus or movement buttons in the [XY MEAS] menu.

5 To return the measurement line to the center, press the [CTRNG] button.

6 To show or hide XY measurement lines, use the [DISPLAY] checkbox in the [XY MEAS] menu.

7 To return to the [TOOL MENU], press the [X] button in the [XY MEAS] menu.



XY measurement operation

✔ XY measurement display

- The XY measurement values are coupled with optical zoom magnification. When the zoom magnification is changed, the values of the measurement results are updated without changing the position of measurement lines.
- The XY measurement values are coupled with unit and calibration settings. When the settings are changed, the values of the measurement results are updated without changing the position of the measurement lines.
- While the [XY MEAS] menu is displayed on the screen, measurement results can be moved using the stylus (in the same way as dragging with the mouse).
- The width of XY measurement lines and character size of the dimension can be changed in the [TOOL SET: MAIN] window.
- The ON/OFF setting of the XY measurement remains when the power is turned off. If the power is turned off with the XY measurement being displayed, it appears automatically when the power is turned on again.

(2) Displaying cross scales

Display the X-axis and Y-axis scales (called cross scales) on the screen.

When cross scales are displayed, approximate size of an object can be calculated. X scale and Y scale can be independently moved. So it is possible to move either scale near the object to make measurement easier.

1 Display the [TOOL MENU].

2 Press the [X SCALE] button.

The [X SCALE] menu appears and X-axis scale and Y-axis scale appear on the screen.

3 Move each scale to a desired location.

Perform the following steps while the [X SCALE] menu is displayed.

1 Select a scale with a stylus.

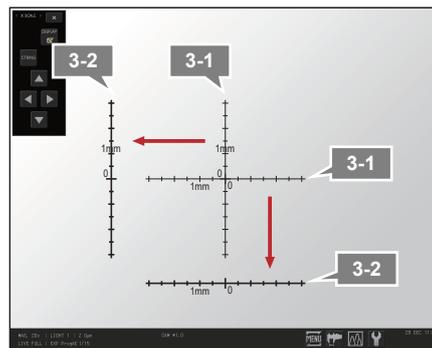
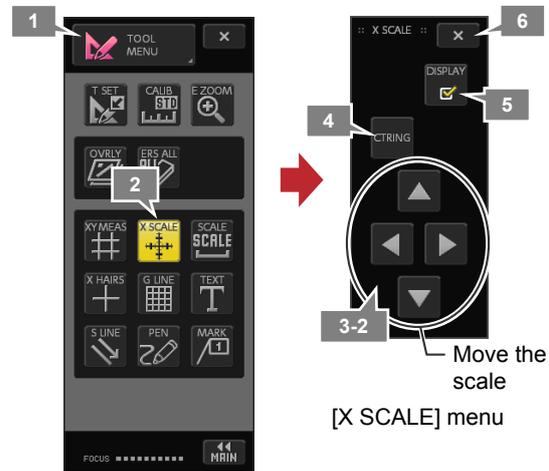
The selected scale will be highlighted.

2 Move the scales on the screen using the stylus or movement buttons in the [X SCALE] menu.

4 To return the cross scale to the center, press the [CTRNG] button.

5 To show or hide scales, use the [DISPLAY] checkbox in the [X SCALE] menu.

6 To return to the [TOOL MENU], press the [X] button in the [X SCALE] menu.



Handling cross scales

✔ Cross scale display

- The cross scale values are coupled with optical zoom magnification. When the zoom magnification is changed, location of the scales does not change but numbers on the scales are updated.
- The cross scale values are coupled with unit and calibration settings. When the settings are changed, location of the scales does not change but numbers on the scales are updated.
- The scales may not be displayed depending on the unit and calibration settings. In this case, change the unit setting.
- The ON/OFF setting of the cross scales remains when the power is turned off. If the power is turned off with the cross scales being displayed, they appear automatically when the power is turned on again.

(3) Displaying scales

Display a scale on the screen. When a scale is displayed, approximate size of an object can be calculated.

1 Display the [TOOL MENU].

2 Press the [SCALE] button.

The [SCALE] menu appears and a scale is displayed at bottom right of the screen.

3 Press the [COLOR] button to select a color of the scale.

The color can be changed later.

4 To change the length of the scale, select the length value field and enter a desired value.

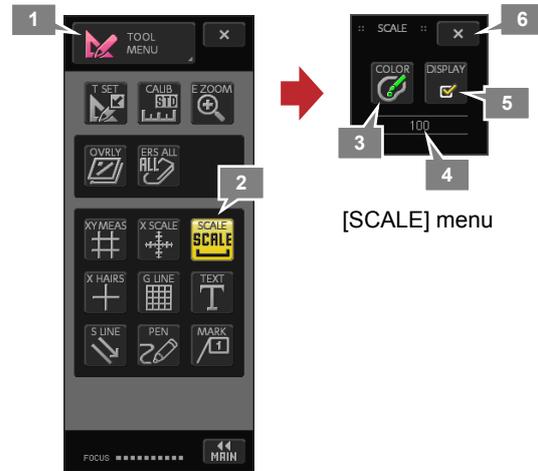
Pressing the scale length value field displays a keypad. Press keys to enter a desired value and press [ENTER] to commit the value.

When the [X] button is pressed, the keypad closes without updating the value.

Note: The unit cannot be changed. If the value is changed to a value that does not fit the displayable size, the length will be shown as 10 times, 100 times, etc. or 1/10, 1/100, etc.

5 To show or hide the scale, use the [DISPLAY] checkbox in the [SCALE] menu.

6 To return to the [TOOL MENU], press the [X] button in the [SCALE] menu.



Showing the scale

✓ Scale display

- The display of the scale is coupled with optical zoom magnification.
- The scale values are coupled with unit and calibration settings. When the settings are changed, the value does not change but the length of the scale is changed.
- A dimension may not be displayed on the scale and “ERROR” may be displayed depending on the calibration value settings. This happens, for example, when the entire screen size is set to 1 mm. In this case, change the unit setting.
- The character size of a dimension of the scale can be changed in the [TOOL SET: MAIN] window.
- The ON/OFF setting of the scale remains when the power is turned off. If the power is turned off with the scale being displayed, it appears automatically when the power is turned on again.

(4) Displaying crosshairs and circles

Display crosshairs and concentric circles on the screen.

The displayed crosshairs and circles can be used for centering of an object and horizontal or vertical adjustment of the object. The crosshairs can be moved to a desirable location so that it is convenient for viewing an object.

1 Display the [TOOL MENU].

2 Press the [X HAIRS] button.

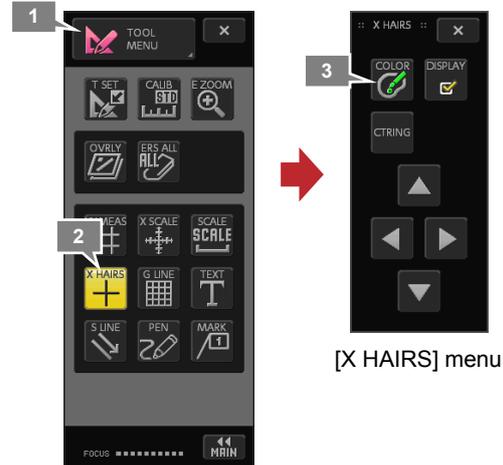
The [X HAIRS] menu appears and crosshairs and circles are displayed on the screen in accordance with the settings of [TOOL SET: X HAIRS].

3 Press the [COLOR] button to select the color.

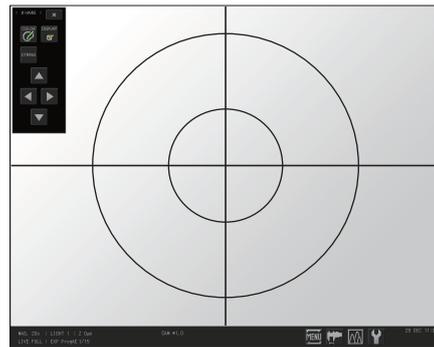
The color can be changed later.

4 To change the settings of crosshairs and circles, open [TOOL SET: X HAIRS] window and do the following settings: (See “7.2.2 Configuring crosshairs.”)

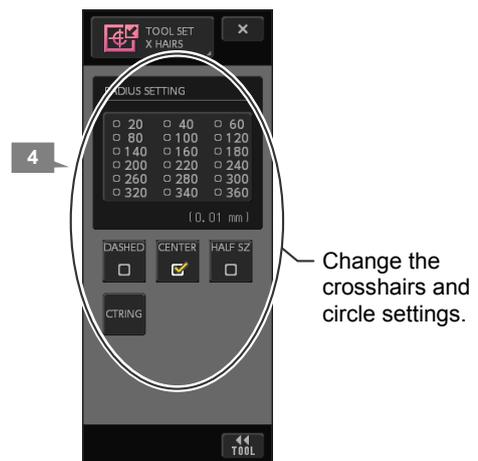
- **[RADIUS SETTING] area**
Specify the size of a concentric circle to be displayed using checkboxes representing the size from 20 to 360.
- **[DASHED] checkbox**
Select the line type of crosshairs solid or dashed. Circles are always drawn in solid line.
- **[CENTER] checkbox**
Specify whether the intersection of the crosshairs are painted.
- **[HALF SIZE] checkbox**
Specify whether to draw crosshairs in normal size or half size.
- **[CTRING] button**
Restore the crosshairs to the center after the crosshairs are moved.



[X HAIRS] menu



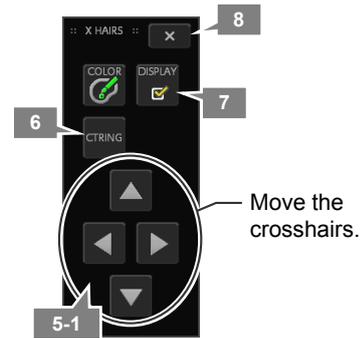
Displaying crosshairs and circles



Display settings of crosshairs and circles ([TOOL SET: X HAIRS] window)

5 Use either of the following to move the crosshairs.

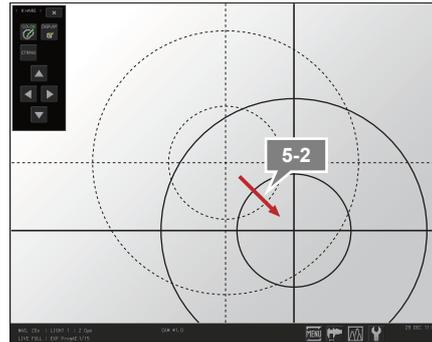
- 1 Press movement buttons of the [X HAIRS] menu.**
- 2 Use the stylus to move the intersection of the crosshairs on the screen.**



6 Press the [CTRING] button to restore the crosshairs to the center of the screen.

7 To show or hide crosshairs and circles, use the [DISPLAY] checkbox in the [X HAIRS] menu.

8 To return to the [TOOL MENU], press the [X] button in the [X HAIRS] menu.



Moving crosshairs and circles

✔ Crosshairs and concentric circle display

- The display of the concentric circle is coupled with zoom magnification. The cross-hair display does not change.
- The display of the concentric circle is coupled with unit and calibration settings. When the settings are changed, the size of the concentric circles changes. The cross-hair display does not change.
- The line width of the concentric circle and crosshairs can be changed in the [TOOL SET: MAIN] window.
- The ON/OFF setting of the crosshairs (concentric circle) remains when the power is turned off. If the power is turned off with the crosshairs being displayed, they appear automatically when the power is turned on again.

(5) Displaying grid lines on the screen

Display grid lines on the screen.

Grid lines can be used for object positioning or horizontal or vertical adjustment of the object. Distance between grid lines can be arbitrarily configured.

1 Display the [TOOL MENU].

2 Press the [G LINE] button.

The [G LINE] Menu appears and grid lines are displayed on the screen in accordance with the settings of [TOOL SET: G LINE].

3 Use the [COLOR] button to select color.

The color can be changed later.

4 To change distance between grid lines, open the [TOOL SET: G LINE] window and do the following settings:

1 Select a mode for setting grid line distance from option buttons in the [MODE] area.

2 Do the following depending on the mode you have selected.

If [DIRECT CLICK] is selected:

Specify two points on the screen to create grid lines. To redo it, press the [ERASE] button to clear the grid lines before specifying two points again.

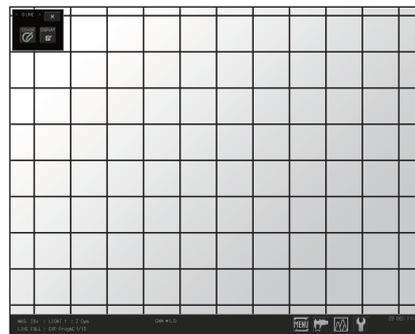
If [INPUT VALUE] is selected:

Enter the width and height numerically. Select the reference point from [TOPLEFT] and [CENTER]. Press the input field, the keypad appears. Press keys to enter a desired value and press the [ENTER] key to commit entry.

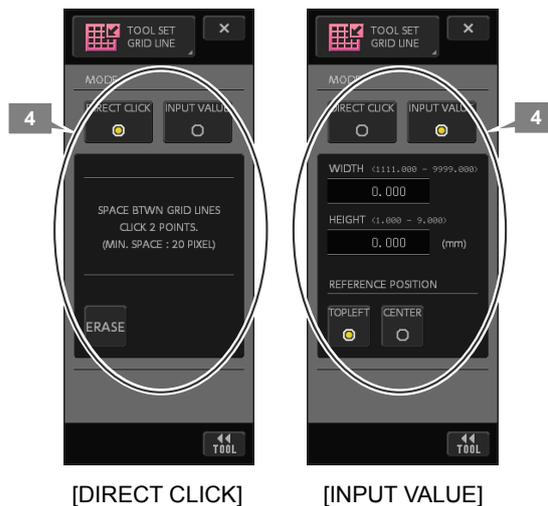
Note: The minimum grid line distance is 20 pixels. No grid lines are displayed if a smaller value is specified.

5 To show or hide grid lines, use the [DISPLAY] checkbox in the [G LINE] menu.

6 To return to the [TOOL MENU], press the [X] button of the [G LINE] menu.



Displaying grid lines



Changing grid line setting ([TOOL SET: G LINE] window)

✔ Grid line display

- The display of grid lines does not change even when the optical zoom magnification or the setting of unit and calibration is changed.
- The line width of the grid lines can be changed in the [TOOL SET: MAIN] window.
- The ON/OFF setting of the grid lines remains when the power is turned off. If the power is turned off with the grid lines being displayed, they appear automatically when the power is turned on again.

(6) Inserting text annotation

Place alphanumeric text anywhere on the screen.

1 Display the [TOOL MENU].

2 Press the [TEXT] button.

The [TEXT] menu appears.

3 Use the [COLOR] button to select color.

The color selected here applies to text that is entered from the next time. Color of the text already entered cannot be changed.

4 Specify location of text input on the screen.

When the location is specified, the keypad appears.

5 Enter desired text using the keypad up to 31 characters.

Press the [SHIFT] button for switching upper and lower case. Use the [CLR] button to erase what you have entered. Press [BS] to backspace one character.

Press the [ENTER] button when the text is entered. Press the [X] button to close the keypad without saving the text.

6 Repeat steps 3 to 5 to continue entering another text.

7 Press the [UNDO] or [REDO] button to undo or redo the text entry as required.

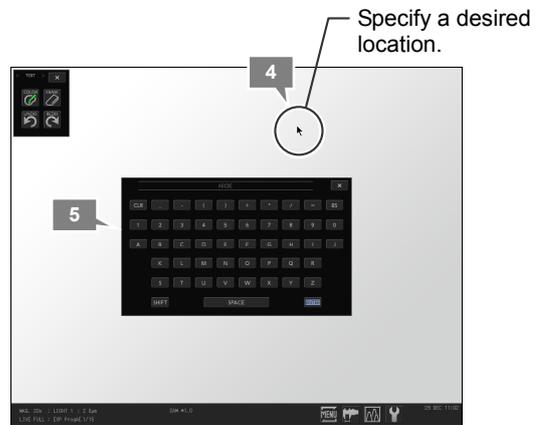
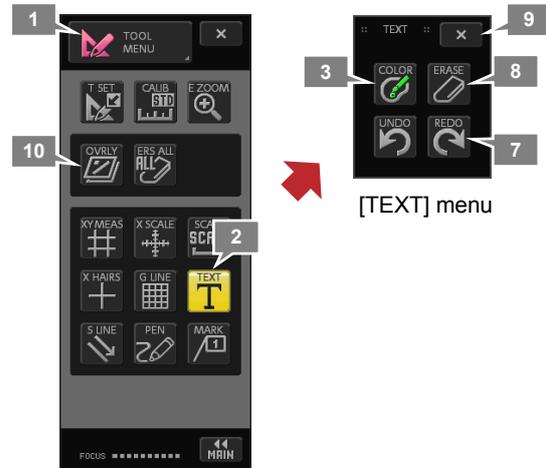
8 To delete the entered text, press the [ERASE] button in the [TEXT] menu.

When the [ERASE] button is pressed, a confirmation message is displayed. Pressing [YES] deletes all the text you have entered.

9 To return to the [TOOL MENU], press the [X] button in the [TEXT] menu.

10 To show or hide entered text, switch to show or hide overlay.

It is not possible to selectively show or hide only text. Switch to show or hide the entire overlay.



Displaying text

✔ Text annotation display

- The display of text annotation does not change even when the optical zoom magnification or the setting of unit and calibration is changed.
- The text size can be changed in the [TOOL SET: MAIN] window. Note that the size of the text already entered does not change.

7

Using Annotation and Simplified Measurement

(7) Drawing straight lines and arrows

Draw a straight line or arrow by specifying two points on the screen.

1 Display the [TOOL MENU]

2 Press the [S LINE] button.

The [S LINE] menu appears.

3 Press the [COLOR] button to select color.

The color selected here applies to lines that are drawn from the next time. Color of the lines already drawn cannot be changed.

4 Press the [ENDPT] button in the [S LINE] menu. Select shape of an endpoint from [LINE] or [ARROW].

5 Move the stylus on the screen from the starting point to ending point to draw a straight line.

When drawing a line, move the stylus as slowly as possible. If the stylus is moved fast, the line may be broken in the middle.

If [ARROW] has been selected for the endpoint shape, the end of the line will have arrow shape.

6 Repeat steps 3 to 5 to continue drawing another line.

7 Press the [UNDO] or [REDO] button to undo or redo the straight line as required.

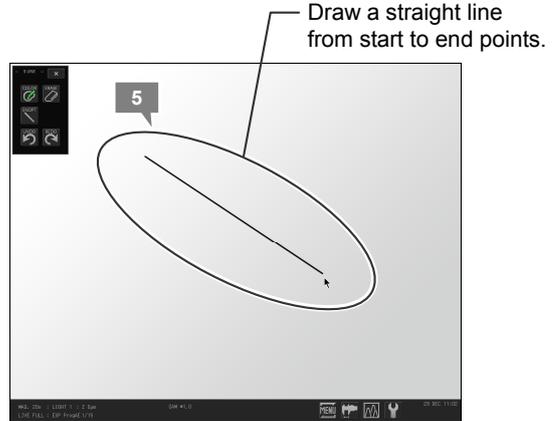
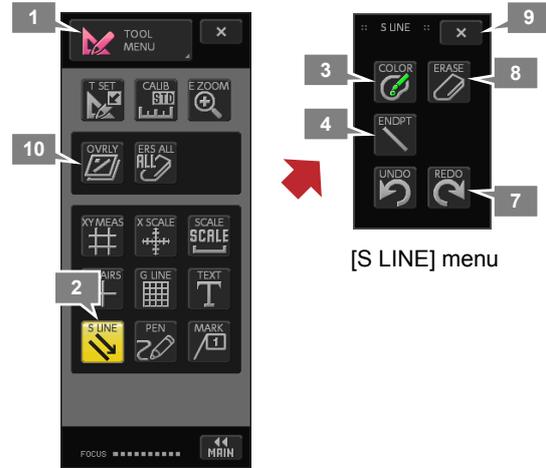
8 To erase the line you have drawn, press the [ERASE] button in the [S LINE] menu.

When the [ERASE] button is pressed, a confirmation message is displayed. Pressing [YES] deletes all the straight line you have drawn.

9 To return to the [TOOL MENU], press the [X] button in the [S LINE] menu.

10 To show or hide a rendered line, switch to show or hide overlay.

It is not possible to selectively show or hide only straight lines. Switch to show or hide the entire overlay.



Drawing straight line

✔ Straight line display

- The display of straight lines does not change even when the optical zoom magnification or the setting of unit and calibration is changed.
- The width of the straight lines can be changed in the [TOOL SET: MAIN] window. Note that the width of the straight lines already drawn does not change.

(8) Drawing free lines

Draw a free line on the screen.

1 Display the [TOOL MENU].

2 Press the [PEN] button.

The [PEN] menu appears.

3 Press the [COLOR] button to select color.

The color selected here applies to lines that are drawn from the next time. Color of the lines already drawn cannot be changed.

4 Draw a free line on the screen using the stylus.

A line is drawn along the track where the stylus has touched.

Move the stylus as slowly as possible. If the stylus is moved fast, a smooth line cannot be drawn.

5 Repeat steps 3 and 4 to continue drawing another line.

6 Press the [UNDO] or [REDO] button to undo or redo the free line as required.

Note: Up to previous 14 free line drawing actions can be undone.

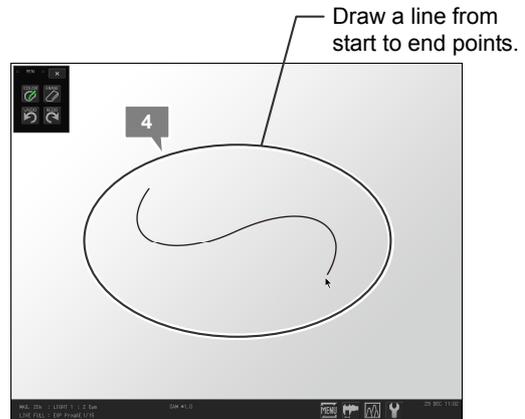
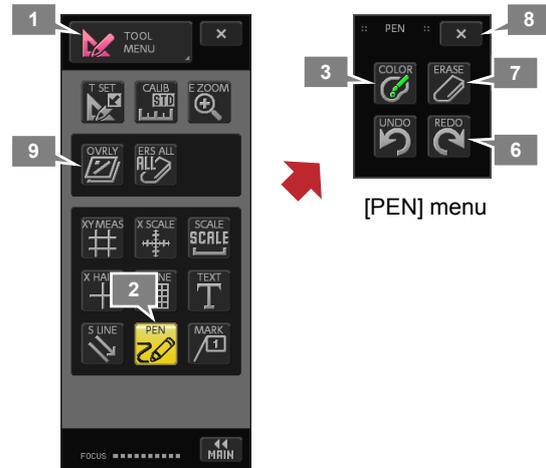
7 To erase all lines you have drawn, press the [ERASE] button in the [PEN] menu.

When the [ERASE] button is pressed, a confirmation message is displayed. Pressing the [ERASE] button deletes all the lines that have been drawn using the PEN tool.

8 To return to the [TOOL MENU], press the [X] button in the [PEN] menu.

9 To show or hide a line drawn using the PEN tool, switch to show or hide overlay.

It is not possible to selectively show or hide only lines drawn by the PEN tool. Switch to show or hide the entire overlay.



Drawing free line

✔ Line display

- The lines drawn on the screen do not change even though the optical zoom magnification or the setting of unit and calibration is changed.
- The width of the PEN lines can be changed in the [TOOL SET: MAIN] window. Note that the width of the lines already drawn does not change.

✔ Using a mouse

Use a commercially available mouse if it is difficult to draw lines with a stylus.

(9) Counting points using count markers

Draw a numbered marker (called count marker) on an arbitrary point on the screen and count the number of points.

Count markers of the same color are serially numbered. Six colors, that is, six series of count markers can be used.

1 Display the [TOOL MENU].

2 Press the [MARK] button.

The [MARK] menu appears.

3 Press the [COLOR] button to select color of count markers.

The counter values are independent for each color of markers.

4 Specify arbitrary points on the screen one by one.

Count markers are added to the specified points with numbers (1 – 99) in the order of touch.

5 Press the [UNDO] or [REDO] button to undo or redo the marker as required.

6 To change the color of count markers, select a color using the [COLOR] button in the [MARK] menu.

When the color is changed, the counter starts from one.

When the color is switched to one of previously used colors, the counter starts from the next number of the markers of the color.

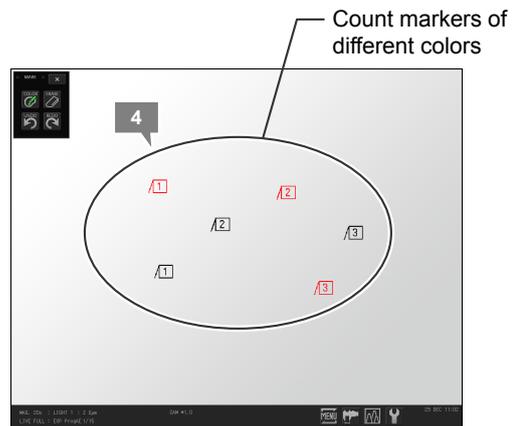
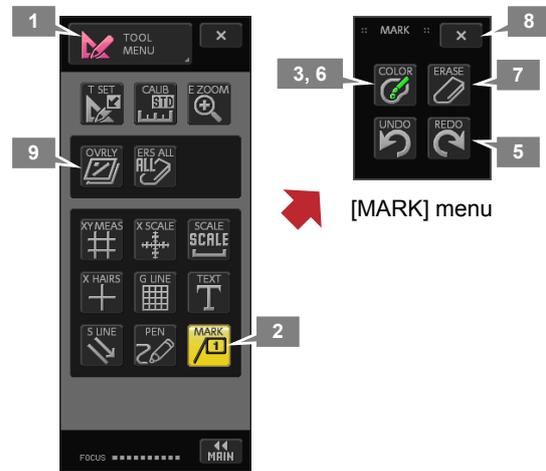
7 To remove count markers you have added, press the [ERASE] button in the [MARK] menu.

When the [ERASE] button is pressed, a confirmation message is displayed. Pressing [YES] deletes all the markers you have added. The value of the count markers is also reset.

8 To return to the [TOOL MENU], press the [X] button in the [MARK] menu.

9 To show or hide count markers, switch to show or hide overlay.

It is not possible to selectively show or hide only count markers. Switch to show or hide the entire overlay.



Adding count markers

✔ Count marker display

- The display of count markers does not change even when the optical zoom magnification or the setting of unit and calibration is changed.
- The line and character size of count markers can be changed in the [TOOL SET: MAIN] window. Note that the character size of the count markers already drawn does not change.

7.3 On-Screen Measurement

- Toolbar Operation -

Simplified measurement allows you to perform the following measurements:

Item	Description	See
Distance between two points	Measures the distance between the two points specified on an image.	p.165
Length of perpendicular line	Length of a perpendicular line drawn from a point to a reference line drawn between two points on an image.	p.166
Angle	Angle between two straight lines drawn on the screen.	p.167
Diameter and circumference of circle	Diameter and circumference of a circle drawn with three points on the circumference.	p.168
Area of polygon	Area of a polygon drawn on the screen	p.169
Distance between centers of two circles	Distance between centers of two circles each drawn with three points on circumference.	p.170
Pitch length	Length of several perpendicular lines drawn from desired points to a reference line and distance between points (pitch distance).	p.171

7.3.1 Displaying Toolbar

- 1 Press the [TOOL BAR] button on the status bar.

The toolbar appears on the top right (or top left) of the screen.

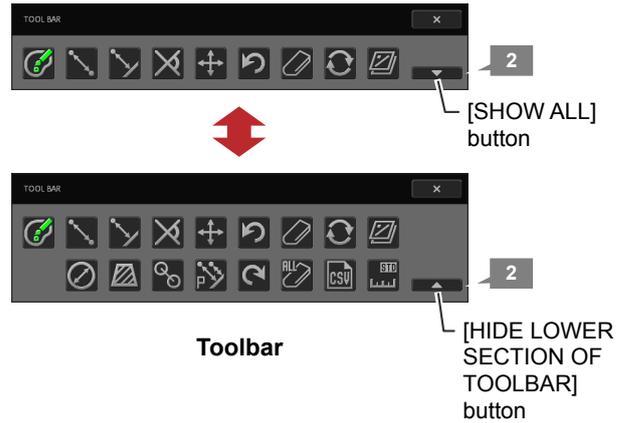
If the [TOOL BAR] button of the status bar is pressed while the toolbar is displayed, the location of the toolbar switches from top to bottom or vice versa.



- 2 Select how much of the toolbar is displayed using the [SHOW ALL] and [HIDE LOWER SECTION OF TOOLBAR] buttons.

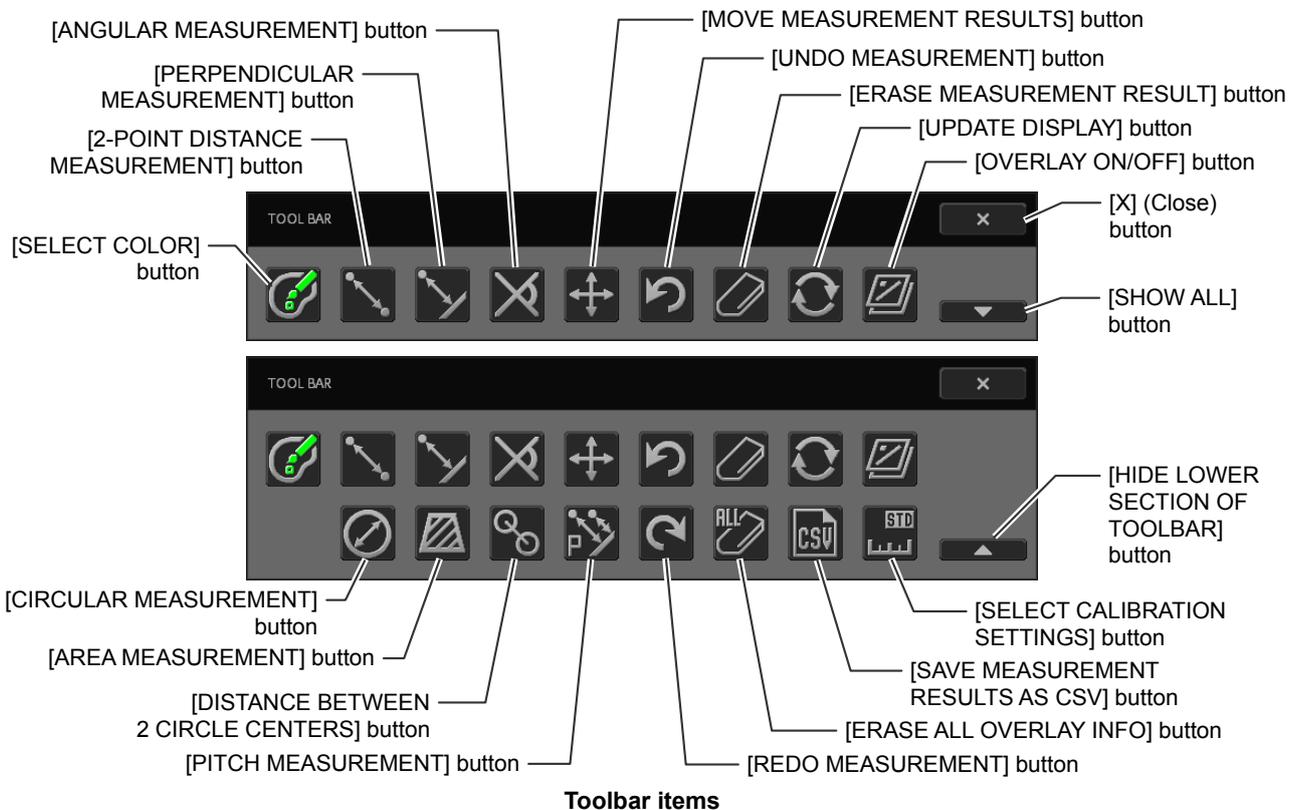
The toolbar has two rows of buttons. The buttons on the lower row are hidden when the toolbar is displayed.

Press [SHOW ALL] on the bottom right of the toolbar to show all buttons. Pressing the [HIDE LOWER SECTION OF TOOLBAR] button hides buttons in the lower row.



7

Items on the Toolbar



7.3.2 Measuring on an Image

Simplified measurement allows you to measure distance, angle, a diameter of a circle, or area of a polygon on an image.

❗ Configuring unit and calibration

Before measurement, make sure unit and calibration are properly configured. If these settings are changed, all measurement results are cleared.

✔ Measuring on a live image

When measurement is performed on a live image, the image and measurement results may be misaligned depending on the object state. Take a still image using the [FREEZE] button, and start measurement.

(1) Measuring distance between two points

Measure the distance between the two points specified on an image.

- 1 Display the toolbar.
- 2 Press the [SELECT COLOR] button to select color of measurement results.
- 3 Press the [2-POINT DISTANCE MEASUREMENT] button.

A blue frame appears around the button.

- 4 Specify two arbitrary points (A and B in the figure) and check the distance between the two points.

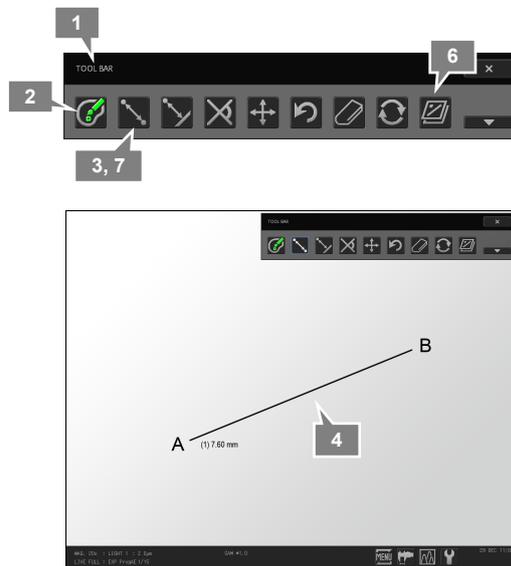
When the start and end points are specified, a measurement line is drawn between them and the distance between the two points is shown.

- 5 Repeat step 4 to continue measurement.

- 6 To show or hide the measurement result, switch to show or hide overlay.

It is not possible to selectively show or hide only the measurement result. Switch to show or hide the entire overlay.

- 7 To end measurement, press the [2-POINT DISTANCE MEASUREMENT] button to deselect the tool.



Measuring distance between two points

✔ Undoing and redoing measurement

Measurement can be cancelled or redone by pressing the [UNDO MEASUREMENT] or [REDO MEASUREMENT] button respectively.

✔ Measurement result display

- If the optical zoom magnification or the setting of unit and calibration is changed, all measurement results are cleared.
- The line width and character size of measurement result can be changed in the [TOOL SET: MAIN] window.

(2) Measuring length of a perpendicular line

Measure length of a perpendicular line drawn from a point to a reference line drawn between two points on an image.

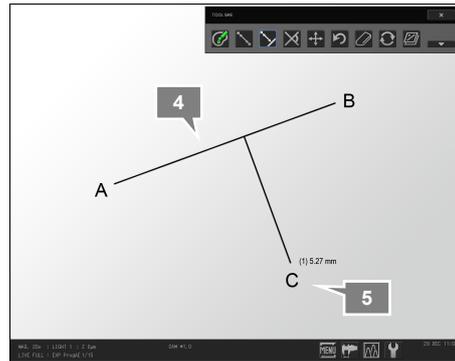
- 1 Display the toolbar.**
- 2 Press the [SELECT COLOR] button to select color of measurement results.**
- 3 Press the [PERPENDICULAR MEASUREMENT] button.**

A blue frame appears around the button.

- 4 Specify two arbitrary points (A and B in the figure) to draw a reference line for measurement.**
- 5 Specify an arbitrary point (C in the figure) from which you want to measure distance to the reference line.**

When the point is specified, a perpendicular line is drawn from the point to the reference line and its distance is shown.

- 6 Repeat step 5 to continue measurement another perpendicular line from the same reference line.**
- 7 To show or hide the measurement result, switch to show or hide overlay.**
It is not possible to selectively show or hide only the measurement result. Switch to show or hide the entire overlay.
- 8 To end measurement, press the [PERPENDICULAR MEASUREMENT] button to deselect the tool.**



Measuring distance from reference line

✓ Undoing and redoing measurement

Measurement can be cancelled or redone by pressing the [UNDO MEASUREMENT] or [REDO MEASUREMENT] button respectively.

✓ Measurement result display

- If the optical zoom magnification or the setting of unit and calibration is changed, all measurement results are cleared.
- The line width and character size of measurement result can be changed in the [TOOL SET: MAIN] window.

(3) Measuring angle

Measure angle between two straight lines drawn on the screen.

- 1 Display the toolbar.
- 2 Press the [SELECT COLOR] button to select color of measurement results.
- 3 Press the [ANGULAR MEASUREMENT] button.

A blue frame appears around the button.

- 4 Draw the first line by specifying two arbitrary points (A and B in the figure) on the screen.

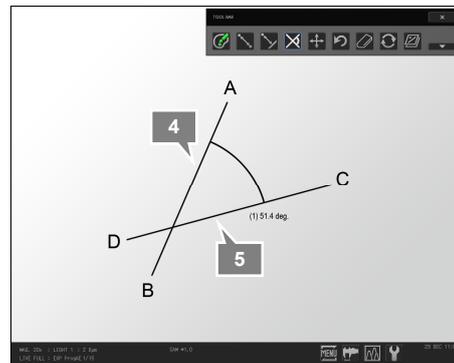
When the start and end points are specified, a line for measurement is drawn between them.

- 5 Draw the second line by specifying two arbitrary points (C and D in the figure) on the screen.

When two lines are drawn, an angle surrounded by two intersecting lines is shown.

If an angle cannot be measured such as when you specify the same point for start and end points of a line or two lines are completely parallel, "NG" is displayed.

- 6 Repeat steps 4 and 5 to continue measuring another angle.
- 7 To show or hide the measurement result, switch to show or hide overlay.
- 8 To end measurement, press the [ANGULAR MEASUREMENT] button to deselect the tool.



Measuring angle

✓ Undoing and redoing measurement

Measurement can be cancelled or redone by pressing the [UNDO MEASUREMENT] or [REDO MEASUREMENT] button respectively.

✓ Measurement result display

- If the optical zoom magnification or the setting of unit and calibration is changed, all measurement results are cleared.
- The line width and character size of measurement result can be changed in the [TOOL SET: MAIN] window.

(4) Measuring diameter and circumference of circle

Measure diameter and circumference of a circle drawn on the screen.

1 Display the toolbar and press the [SHOW ALL] button.

2 Press the [SELECT COLOR] button to select color of measurement results.

3 Press the [CIRCULAR MEASUREMENT] button.

A blue frame appears around the button.

4 Specify three points (A, B and C in the figure) on circumference of a circle to be drawn on the screen.

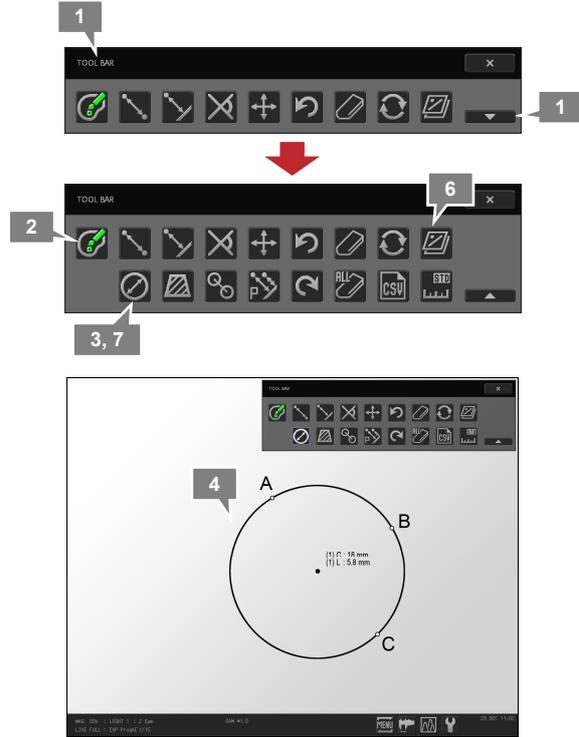
A circle whose circumference passes on the three points is drawn and its diameter and circumference values are shown near the center of the circle.

5 Repeat step 4 to continue measuring another circle.

6 To show or hide the measurement result, switch to show or hide overlay.

It is not possible to selectively show or hide only the measurement result. Switch to show or hide the entire overlay.

7 To end measurement, press the [CIRCULAR MEASUREMENT] button to deselect the tool.



Measuring diameter and circumference of circle

✔ Undoing and redoing measurement

Measurement can be cancelled or redone by pressing the [UNDO MEASUREMENT] or [REDO MEASUREMENT] button respectively.

✔ Measurement result display

- If the optical zoom magnification or the setting of unit and calibration is changed, all measurement results are cleared.
- The line width and character size of measurement results can be changed in the [TOOL SET: MAIN] window.

(5) Measuring the area of a polygon

Measure the area of a polygon drawn on the screen.

1 Display the toolbar and press the [SHOW ALL] button.

2 Press the [SELECT COLOR] button to select color of measurement results.

3 Press the [AREA MEASUREMENT] button.

A blue frame appears around the button.

4 Specify vertexes of a polygon (A, B, C and D in the figure) on the screen one by one.

5 Press the [AREA MEASUREMENT] button again.

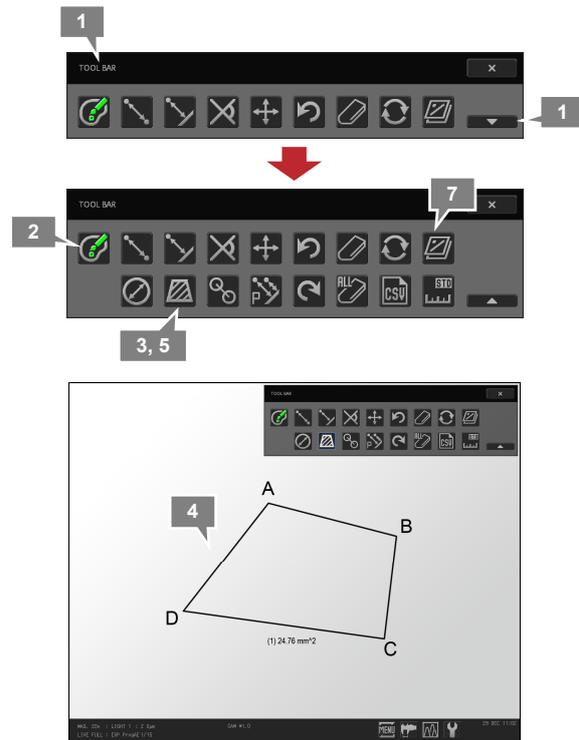
The starting and end points (D and A in the figure) are connected and the area of the surrounding shape is shown.

Note: When a side that crosses another side is drawn, the area cannot be measured and "NG" is displayed.

6 Repeat steps 3 to 5 to continue measuring another polygon.

7 To show or hide the measurement result, switch to show or hide overlay.

It is not possible to selectively show or hide only the measurement result. Switch to show or hide the entire overlay.



Measuring area of polygon

✓ Undoing and redoing measurement

Measurement can be cancelled or redone by pressing the [UNDO MEASUREMENT] or [REDO MEASUREMENT] button respectively.

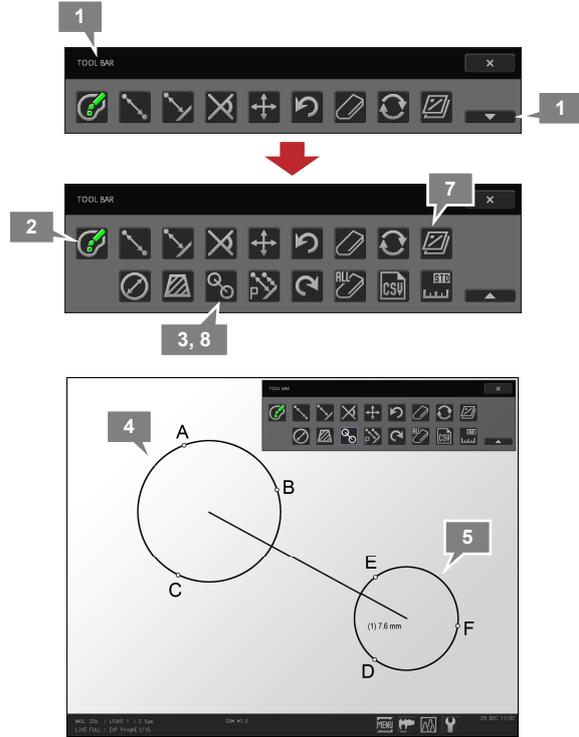
✓ Measurement result display

- If the optical zoom magnification or the setting of unit and calibration is changed, all measurement results are cleared.
- The line width and character size of measurement results can be changed in the [TOOL SET: MAIN] window.

(6) Measuring distance between centers of two circles

Measure distance between centers of two circles drawn on the screen.

- 1** Display the toolbar and press the [SHOW ALL] button.
- 2** Press the [SELECT COLOR] button to select color of measurement results.
- 3** Press the [DISTANCE BETWEEN 2 CIRCLE CENTERS] button.
A blue frame appears around the button.
- 4** Specify three points (A, B and C in the figure) on circumference of the first circle to be drawn.
A circle whose circumference passes on the three points is drawn on the screen.
- 5** Specify three points (D, E and F in the figure) on circumference of the second circle.
Another circle whose circumference passes on the three points is drawn on the screen. A straight line is drawn from the center of the first circle to that of the second, and distance between the two circles is shown.
- 6** Repeat steps 4 and 5 to continue measuring distance of other circles.
- 7** To show or hide the measurement result, switch to show or hide overlay.
It is not possible to selectively show or hide only the measurement result. Switch to show or hide the entire overlay.
- 8** To end measurement, press the [DISTANCE BETWEEN 2 CIRCLE CENTERS] button to deselect the tool.



Measuring distance between the centers of two circles

Undoing and redoing measurement

Measurement can be cancelled or redone by pressing the [UNDO MEASUREMENT] or [REDO MEASUREMENT] button respectively.

Measurement result display

- If the optical zoom magnification or the setting of unit and calibration is changed, all measurement results are cleared.
- The line width and character size of measurement results can be changed in the [TOOL SET: MAIN] window.

(7) Measuring pitch distance

Measure length of several lines drawn from desired points to a reference line. For the second and subsequent points, difference between points (pitch distance) can also be measured.

1 Display the toolbar and press the [SHOW ALL] button.

2 Press the [SELECT COLOR] button to select color of measurement results.

3 Press the [PITCH MEASUREMENT] button.

A blue frame appears around the button.

4 Specify two arbitrary points (A and B in the figure) on the screen to draw a reference line.

A reference line is drawn from the starting point to the end point.

5 Specify arbitrary points (C and D in the figure) to be measured.

When a point is specified, a perpendicular line is drawn from the point to the reference line. The length of the perpendicular line is shown.

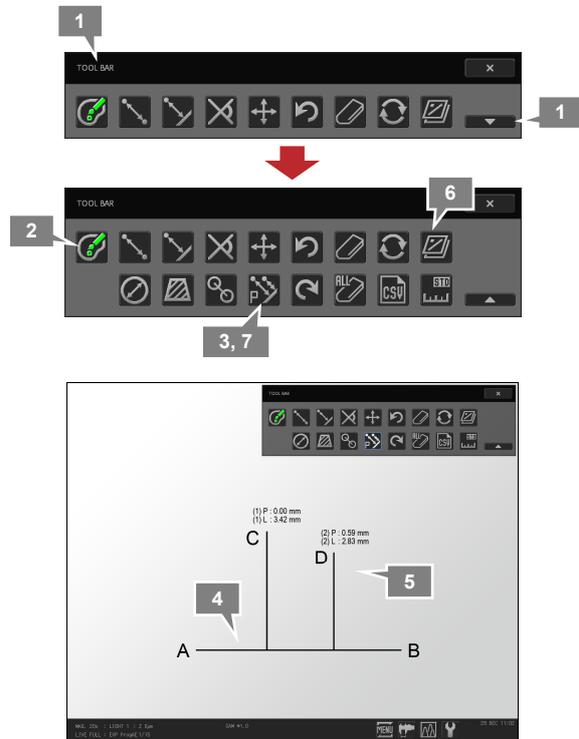
For the second and subsequent points, distance from the previous point (pitch distance) is shown as well as the distance to the reference line.

6 To show or hide the measurement result, switch to show or hide overlay.

It is not possible to selectively show or hide only the measurement result. Switch to show or hide the entire overlay.

7 To end measurement, press the [PITCH MEASUREMENT] button to deselect the tool.

8 Repeat steps 3 and 7 to measure pitch distances with a new reference line.



Measuring pitch distances

✔ Undoing and redoing measurement

Measurement can be cancelled or redone by pressing the [UNDO MEASUREMENT] or [REDO MEASUREMENT] button respectively.

✔ Measurement result display

- If the optical zoom magnification or the setting of unit and calibration is changed, all measurement results are cleared.
- The line width and character size of measurement results can be changed in the [TOOL SET: MAIN] window.

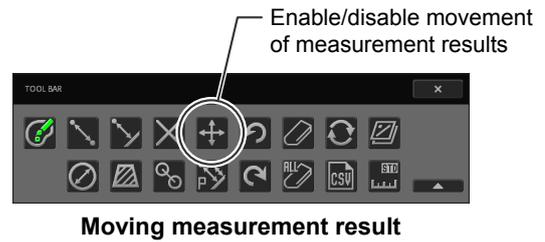
7.3.3 Handling Measurement Results

Editing annotation and measurement results using the ShuttlePix Editor

- If a tool file is saved when an image is captured, content drawn by annotation and simplified measurement can be edited using the ShuttlePix Editor. See “7.2.2 Configuring basic annotation settings” for details.
- Annotations and measurement results pasted (embedded) into an image are not editable. To use the ShuttlePix Editor to edit them, turn off the setting of “Paste to Image.” See “7.2.2 Configuring basic annotation settings.”

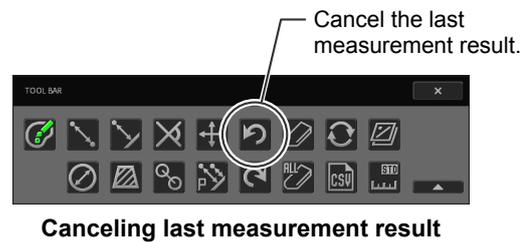
(1) Moving measurement results

Press the [MOVE MEASUREMENT RESULTS] button to display a blue frame around the button so that the measurement results shown on the screen can be moved. Drag the measurement result using the stylus to move the results to another position. Press the button again to hide the blue frame so that the movement is disabled.



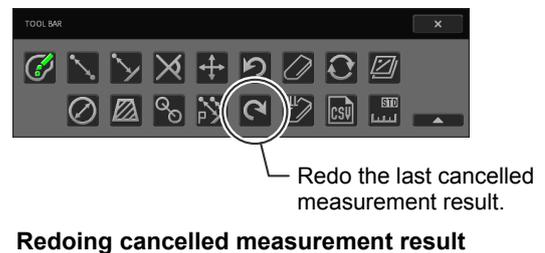
(2) Canceling the last measurement result

Press the [UNDO MEASUREMENT] button to cancel the most recent measurement and delete the display of its measurement result.



(3) Redoing the cancelled measurement result

Redisplay the measurement result last cancelled. Press the [REDO MEASUREMENT] button to redisplay the measurement result deleted by the [UNDO MEASUREMENT] button most recently. Note: Nothing happens if the button is pressed unless you have cancelled a measurement result.



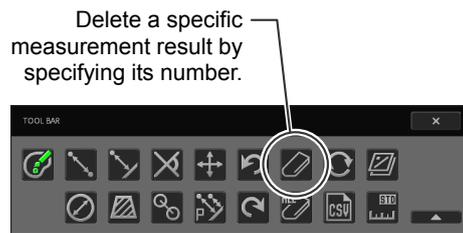
(4) Erasing an arbitrary measurement result

Order numbers given to each simplified measurement result are shown.

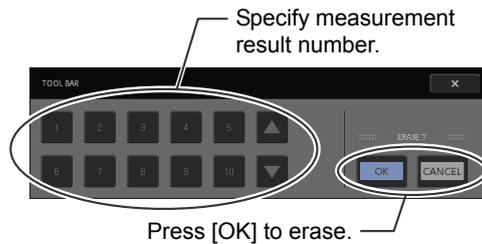
Press the [ERASE MEASUREMENT RESULT] button on the toolbar. The toolbar display changes and buttons for selecting execution order of measurement results are shown.

- If the execution history contains more than 10 results, switch the screen using the upper and lower arrow buttons.
- Numbers that can be erased are shown in white. Numbers that cannot be erased (already erased or not executed) are shown in gray.

Press the number and press [OK] under the "ERASE ?" message. The measurement result having that order number is deleted.



[ERASE MEASUREMENT RESULT] button



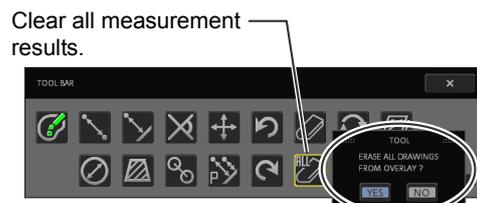
Erasing measurement result

(5) Clearing all measurement results

Press the [ERASE ALL OVERLAY INFO] button on the toolbar to clear the drawn items in the overlay including all the measurement results.

When the button is pressed, a confirmation message is displayed. Press [YES] to delete results or [NO] to cancel the operation.

When [YES] is selected, the drawn items in the overlay (all measurement results, text straight lines, pen lines, count markers) are cleared.



Clearing all measurement results

(6) Updating display of overlay

If simplified measurement operations are repeated or the overlapped display area is deleted due to measurement clearance or deletion, there may be a case where previous measurement results disappear.

If this happens, press the [UPDATE DISPLAY] button on the tool bar to update the screen. All the measurement results will be displayed again.



Updating display of the overlay

(7) Writing measurement results to CSV file

Press the [SAVE MEASUREMENT RESULTS AS CSV] button to write measurement results to a CSV-format file (extension “.csv”). The saving location of a CSV file is the same as the saving location for images.

Note: See “7.2.2 Configuring basic annotation settings” for the content of an output CSV file.



Write measurement results to a CSV file.

Outputting a CSV file

✔ Applying a desired file name to a CSV file

When image files are set to be named manually in capturing, pressing the [SAVE MEASUREMENT RESULTS AS CSV] button displays the [SAVE AS] window. Check the destination folder and file name, and change the setting as required. Pressing the [SAVE] button saves the CSV file in accordance with the setting you have made.

For details on the procedure for setting the file naming system, see “8.4.2 Configuring File Naming System and Convention.”

✔ Automatically saving a CSV file

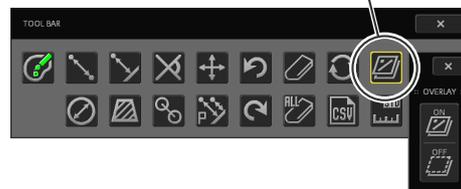
Configure so that a CSV file is automatically saved when the image is captured. See “7.2.2 Configuring basic annotation settings.”

(8) Displaying or hiding overlay

Simplified measurement results are rendered on an overlay. All the results can be shown or hidden at once by showing or hiding the overlay.

Note: An overlay can be shown or hidden using the tool menu or toolbar.

Show or hide an overlay using the [OVERLAY ON/OFF] button.



Showing or hiding an overlay

(9) Switching calibration settings

The calibration setting modes can be switched between “standard” and “user.” The setting mode is a basis for measuring length.

Note: All measurement results are cleared if calibration setting is switched.

Switch calibration settings using the [SELECT CALIBRATION SETTINGS] button.



Switching calibration settings

8 Changing Initial Settings



Changing Initial Settings

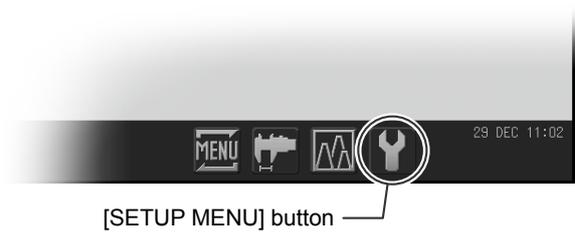
This chapter describes initial settings of this system.

8.1 Operating Setup Menu

Displaying the Setup menu

Press the [SETUP MENU] button on the status bar to display the [SETUP MENU] window.

When the [SETUP MENU] window is displayed, the status bar and other operating menus will automatically disappear.



Displaying SETUP MENU

Switching the [SETUP MENU] windows

There is the [SETUP MENU SELECT] button on the top left corner of the [SETUP MENU] window.

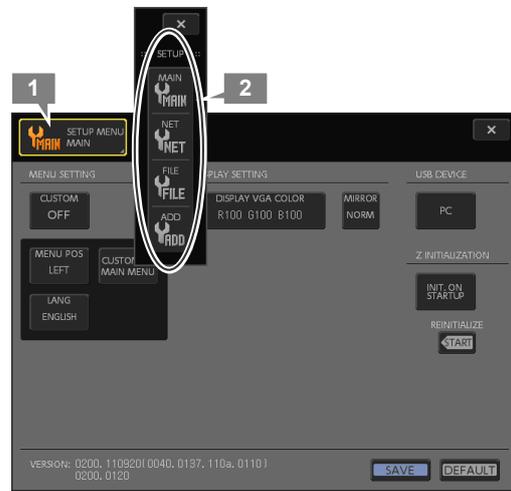
Pressing this button displays the [SETUP] submenu. The [SETUP MENU] window can be switched to any of the following screens.

- 1 Press the [MENU SELECT] button of the [SETUP MENU].

The [MENU] submenu opens and four buttons are displayed: [MAIN], [NET], [FILE] and [ADD].

- 2 Press a desired button.

The setup menu display changes.



Switching the SETUP MENU

[SETUP MENU] windows

The Setup Menu has the following screens:

- **[SETUP MENU: MAIN] window**

Configures basic settings of this system including settings for the menu display, monitor, USB device mode, and Z position initialization.



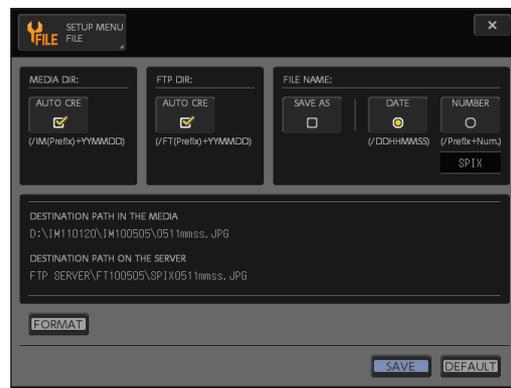
- **[SETUP MENU: NETWORK] window**

Configures several settings for connecting the system to the network including basic settings, HTTP server settings, and settings for connecting to an FTP server.



- **[SETUP MENU: FILE] window**

Configures folders and files for saving images including folders on a recording medium and FTP server, file names and initialization of medium.



- **[SETUP MENU: ADDITIONAL] window**

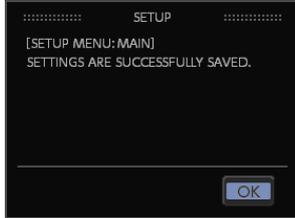
Configures overall settings of this system including date and time, capture operation, electronic zoom magnification, printer and others.



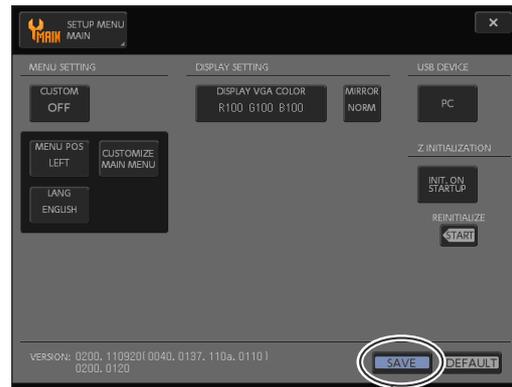
Saving the settings

The setting can be saved by pressing the [SAVE] button at the bottom right of the [SETUP MENU].

When a confirmation message is displayed, press the [OK] button to close the message.



Confirmation Message for Saving the Settings (When rebooting is not required)



Save the setting.

Saving the setting in the [SETUP MENU]

If the setting that requires rebooting of the motorized stand have been changed, a reboot request message for the motorized stand is also displayed. Close the message and press the [POWER] switch to turn off the motorized stand and then turn it on.

✔ Saving the settings

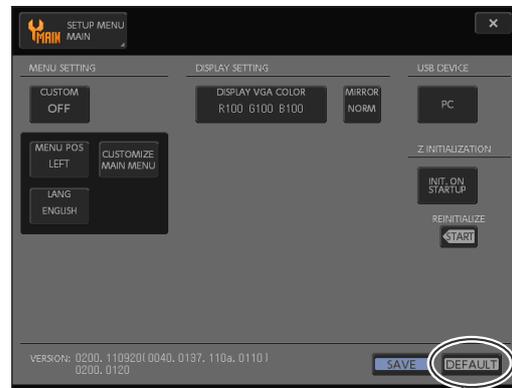
Settings configured in each screen cannot be saved unless you press the [SAVE] button. Note that pressing the [X] (close) button without pressing the [SAVE] button restores to the state before change.

Resetting to initial state

The setting in each [SETUP MENU] can be initialized by pressing the [DEFAULT] button at the bottom right of each [SETUP MENU].

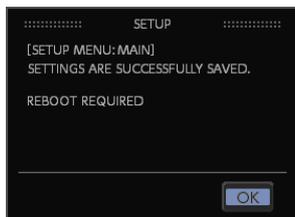
When the [DEFAULT] button is pressed, a confirmation message is displayed next to the button. To initialize the settings, select [YES], and to continue the configuration process without initializing, select [NO].

If [YES] is selected, the setting you have done on the screen are discarded and each item is saved in the initial state. When a confirmation message is displayed, press the [OK] button to close the message.



Reset to initial settings.

Resetting the [SETUP MENU] to the initial state



Confirmation Message for Saving the Settings (Initialization) (When rebooting is required)



Confirmation message

If the setting that requires rebooting of the motorized stand has been changed, a reboot request message for the motorized stand is also displayed. Close the message and press the [POWER] switch to turn off the motorized stand and then turn it on.

8.2 Configuring Basic Settings

- [SETUP MENU: MAIN] Window -

Select [MAIN] using the [SETUP MENU SELECT] button on top left of the [SETUP MENU] window. The [SETUP MENU: MAIN] window appears.

Items in the [SETUP MENU: MAIN] window

[SETUP MENU SELECT] button
Screen name is displayed. Pressing the button displays a submenu for switching menu screens.

[MENU SETTING] area
Configures custom startup settings, location of menu, and language, and customizes the [MAIN MENU].

[DISPLAY SETTING] area
Configures color balance of signal output to monitor and image mirroring.

VERSION display
Displays firmware version.

[X] (Close) button
Close the Setup Menu screen.

[USB DEVICE] area
Configures operating mode of [USB (D)] connectors on the right side of the motorized stand.

[Z INITIALIZATION] area
(Re)initializes the elevating section of motorized stand

[DEFAULT] button
Restore settings of the screen to initial values.

[SAVE] button
Save settings of the screen.

[SETUP MENU: MAIN] window

Area	Content	Ref.
[MENU SETTING] area	Configures custom startup settings, location of menu, and language, and customizes the [MAIN MENU].	p.180 to p.182
[DISPLAY SETTING] area	Configures color balance of signal output to monitor and image mirroring.	p.183, p.184
[USB DEVICE] area	Configures operating mode of [USB (D)] connectors on the right side of the motorized stand.	p.185
[Z INITIALIZATION] area	(Re)initializes the elevating section of motorized stand	p.186, p.187

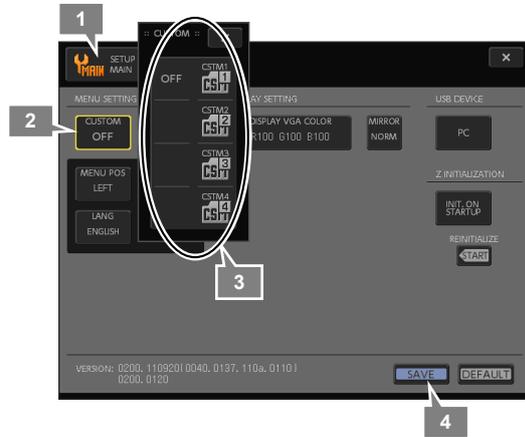
8.2.1 Configuring Menu Display

- [MENU SETTING] Area -

(1) Calling custom settings on startup

Select arbitrary custom settings called on startup.

- 1 Display the [SETUP MENU: MAIN] window.
- 2 Press the [CUSTOM] button in the [MENU SETTING] area.
The [CUSTOM] submenu appears.
- 3 Press a desired custom setting button from [CSTM1] to [CSTM4]. Select [OFF] if not using the custom setting.
The submenu closes and the selected content is display in the [CUSTOM] button.
- 4 Press the [SAVE] button.



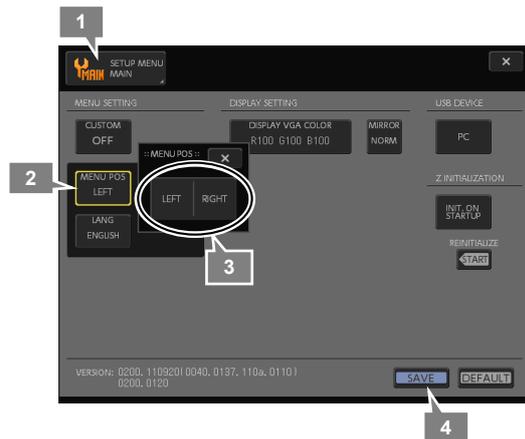
Custom settings for startup

✔ When the [CUSTOM] button is off

If the [CUSTOM] button is off, the capture conditions at the time of the power off operation are applied when the system is turned on.

(2) Configuring the menu location

- 1 Display the [SETUP MENU: MAIN] window.
- 2 Press the [MENU POS] button in the [MENU SETTING] area.
The [MENU POS] submenu appears.
- 3 Press the [RIGHT] or [LEFT] button.
The selected content is displayed on the [MENU POS] button.
- 4 Press the [SAVE] button.



Configuring menu location

(3) Switching the language

Switch display language on the screen between English and Japanese.

- 1 Display the [SETUP MENU: MAIN] window.
- 2 Press the [LANG] button in the [MENU SETTING] area.

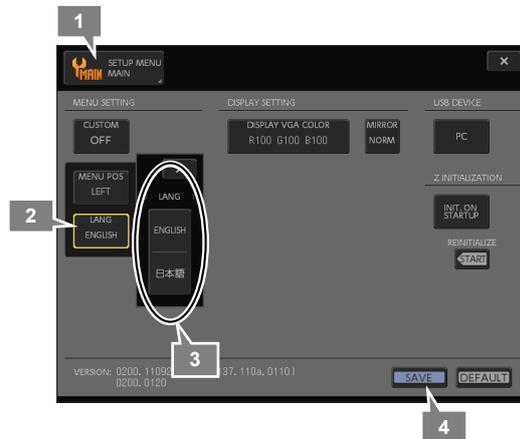
The [LANG] submenu appears.

- 3 Press the [ENGLISH] or [JAPANESE] button.

The selected content is displayed on the button.

- 4 Press the [SAVE] button.

The display language of menu screens changes and a confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Switching language

✔ USB keyboard layout

The language setting influences the USB keyboard layout. When [ENGLISH] is selected, the US keyboard layout is used, and when [JAPANESE] is selected, the Japanese keyboard layout (JIS keyboard layout) is used.

(4) Customizing the [MAIN MENU] display

Show or hide the [EXPOSURE INFORMATION], [SPECIAL CAPTURE BUTTONS] or [DEVICE OPERATION BUTTONS].

1 Display the [SETUP MENU: MAIN] window.

2 Press the [CUSTOMIZE MAIN MENU] button in the [MENU SETTING] area.

The [CUSTOMIZE MAIN MENU] submenu appears.

3 Press the [EXPOSURE INFORMATION], [SPECIAL CAPTURE BUTTONS] or [DEVICE OPERATION BUTTONS] button to show or hide each area.

- **[EXPOSURE INFORMATION] checkbox**

Show or hide the area that contains the Exposure mode indication, the buttons for exposure compensation and AE lock, and the level meter.

- **[SPECIAL CAPTURE BUTTONS] checkbox**

Show or hide the [EDF], [HDR] and [HALO] buttons.

- **[DEVICE OPERATION BUTTONS] checkbox**

Show or hide the buttons for optical zoom magnification and illumination pattern/brightness and the button used for focusing the object (vertical movement of the arm).

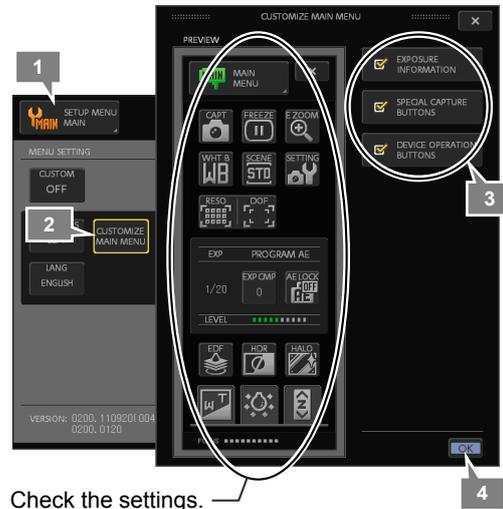
The main menu in accordance with your checkbox selection can be viewed in the [PREVIEW] area.

Note: The display area of the [MAIN MENU] can be reduced and the display space for the live or playback image can be maximized, by hiding the infrequently used buttons and area.

4 Press the [OK] button to close the submenu.

5 Press the [SAVE] button in the [SETUP MENU: MAIN] window.

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Check the settings.

Customizing MAIN MENU

8.2.2 **Configuring Monitor**

- [DISPLAY SETTING] Area -

(1) Adjusting the color balance

Adjust color balance of video signal output from the DVI-I connector on the rear side of the motorized stand.

1 Display the [SETUP MENU: MAIN] window.

2 Press the [DISPLAY VGA COLOR] button in the [DISPLAY SETTING] area.

The [DISPLAY VGA COLOR] window appears.

3 Adjust each gain for R (red), G (green) and B (blue) by looking at the screen.

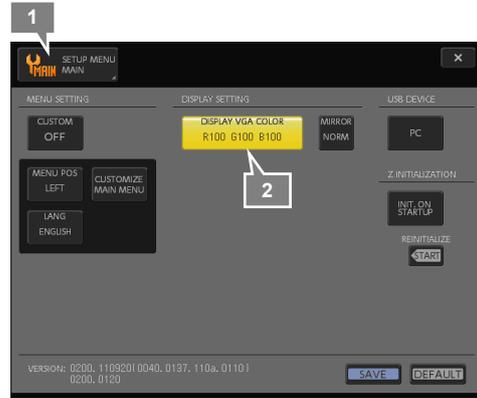
The window shows a slider and adjustment buttons of each gain of R, G and B in this order from left. Perform adjustment using the slider and left and right adjustment buttons.

4 Press the [OK] button.

The [DISPLAY VGA COLOR] window closes.

5 Press the [SAVE] button.

The configured color balance is saved and a confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Configuring Color Balance

(2) Mirroring live images

Configure mirroring and rotation of a live image. Use desired settings in accordance with the status and orientation of a specimen.

1 Display the [SETUP MENU: MAIN] window.

2 Press the [MIRROR] button in the [DISPLAY SETTING] area.

The [MIRROR] submenu appears.

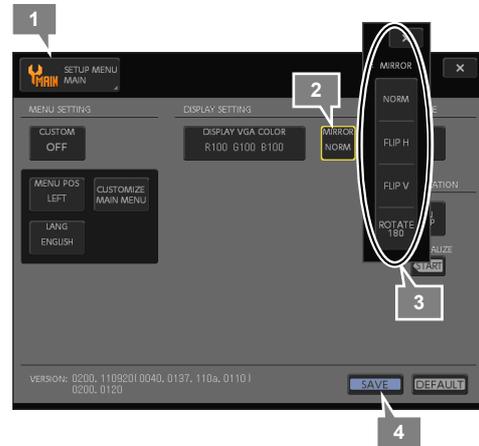
3 Press one of the following buttons to configure the look of a live image.

- **[NORM] - Normal (None)**
Perform neither mirroring nor rotation.
- **[FLIP H] - Flip Horizontally**
Reverse an image horizontally.
- **[FLIP V] - Flip Vertically**
Reverse an image vertically.
- **[ROTATE 180]**
Rotate an image by 180 degrees.

The view of the live image will change in accordance with the selection.

4 Press the [SAVE] button.

Mirroring and rotation settings are saved and a confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Configuring live image mirroring and rotation

✔ Operation while EDF/HDR image is displayed

The [MIRROR] button cannot be operated while an EDF image or HDR image is displayed.

8.2.3 Configuring USB (D) Connector Operating Mode

- [USB DEVICE] Area -

Configure operating mode (device mode) of the USB (D) connectors on the right side of the motorized stand. It is necessary to switch settings depending on what is connected to the connector: printer or PC.

- 1** Display the [SETUP MENU: MAIN] window.
- 2** Press a button in the [USB DEVICE] area.

The [USB DEV] submenu appears.

- 3** Press the [PC] or [PRINTER] button.

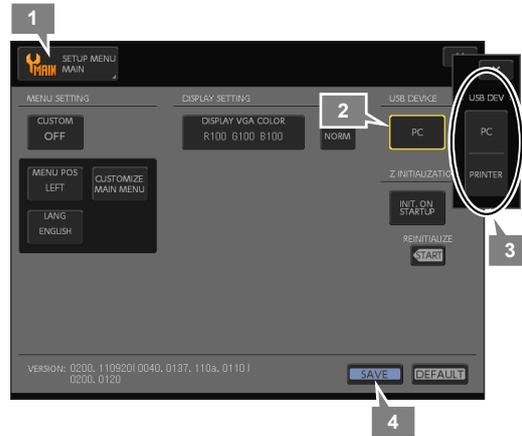
Select [PC] when connecting a personal computer, or [PRINTER] when connecting a printer.

The selected content is displayed on the [USB DEVICE] button.

- 4** Press the [SAVE] button.

A confirmation message for saving the settings and a reboot request message for the motorized stand (if the setting has been changed) are displayed. Press the [OK] button to close the messages.

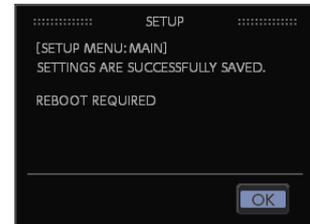
- 5** To switch the setting, turn off the motorized stand and then turn it on.



Configuring operation mode of the USB (D) connector

Switching of the USB device setting

To switch the operation mode of the USB (D) connector, it is necessary to turn off the motorized stand and then turn it on. When the [SAVE] button is pressed after changing the setting, a reboot request message for the motorized stand appears. Be sure to power off and on the motorized stand before connecting the USB (D) connector.



8.2.4 Configuring Elevating Section Position Initialization

- [Z INITIALIZATION] Area -

(1) Configuring arm position initialization

Specify whether to perform initialization of position of the arm (Z-axis position).

1 Display the [SETUP MENU: MAIN] window.

2 Press a button in the [Z INITIALIZATION] area.

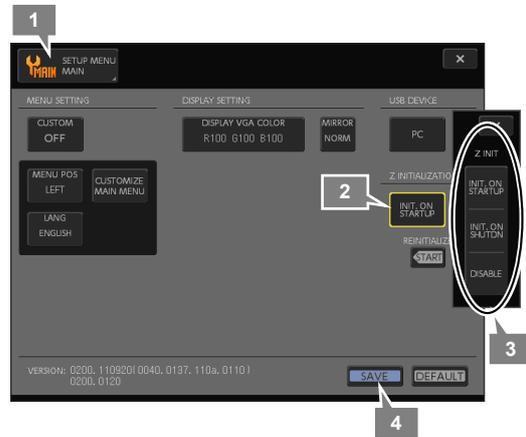
The [Z INIT] submenu appears.

3 Press one of the following buttons to select when to initialize Z position.

- **[INIT ON STARTUP]**
Initializes the arm position when the power is turned on.
- **[INIT ON SHUTDN] (shutdown)**
When power off is requested, initializes the arm position before turning the power off.
- **[DISABLE]**
Performs no initialization of the arm position. Press the [REINITIALIZE - START] button to force initialization.

4 Press the [SAVE] button.

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Configuring arm position Initialization

(2) Initializing the position of the arm (Z-axis position)

Initialize Z position of the moving part at any time.

- 1 Display the [SETUP MENU: MAIN] window.
- 2 Press the [REINITIALIZE - START] button to force initialization in the [Z INITIALIZATION] area.
Z position initialization starts.



Performing arm Initialization

⚠ Caution – Z-axis position initialization

To avoid unexpected injury, note the following when initializing Z position.

- Before starting Z position initialization, make sure the status of every part of the system is in a proper condition and causes no problem when the elevating section starts operating.
- You may hurt your hands or fingers if touching the elevating section, body of the P-400Rv/P-400R, stage, or specimens and containers on the stage during initialization. Take your hands off these devices and parts while Z position initialization is being performed.
- During initialization, the arm moves vertically to the top of the movable range and then back to its original position. It is not necessary to remove the specimen from the stage before initialization; however, pay attention because changing the specimen to a thicker specimen during initialization may cause the P-400Rv/P-400R to collide with the specimen.

8.3 Configuring Network Settings

- [SETUP MENU: NETWORK] Window -

Select [NET] using the [SETUP MENU SELECT] button on top left of the [SETUP MENU] window. The [SETUP MENU: NETWORK] window appears. On this screen, configure several settings for connecting this system to the network.

Items in the [SETUP MENU: NETWORK] window

[SETUP MENU SELECT] button
Screen name is displayed. Display a submenu for switching menu screens.

[INTERNAL SERVER] area
Configures basic network settings and settings for using this system as an HTTP server.

[EXTERNAL SERVER] area
Configures settings for connecting to an FTP server on the network and performs connectivity test. Up to five servers can be registered.

[X] (Close) button
Close the Setup Menu screen.

[DEFAULT] button
Restore settings of the screen to initial values.

[SAVE] button
Save settings of the screen.

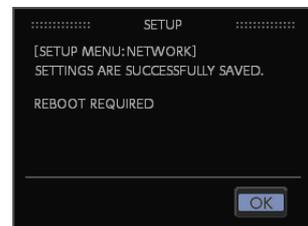
[MAC ADDRESS]
Displays MAC address of the system (motorized stand).

[SETUP MENU: NETWORK] window items

Area	Content	Ref.
[INTERNAL SERVER] area	Configures basic network settings and settings for using this system as an HTTP server.	p.189 to p.192
[EXTERNAL SERVER] area	Configures settings for connecting to an FTP server on the network and performs connectivity test. Up to five servers can be registered.	p.193 to p.196

✔ Changing network settings

System power may have to be turned off and on to enable changes to some network-related settings of this system. In this case, an alert message of "REBOOT REQUIRED" appears when saving the setting in the [SETUP MENU: NETWORK] window.



8.3.1 Configuring HTTP Server

- [INTERNAL SERVER] -

In the [INTERNAL SERVER] area, configure basic settings for connecting this system to the network and settings for using this system as an HTTP server.

(1) Enabling or disabling network connection

Specify whether to connect this system to the network. When the network connection is enabled, the HTTP server feature automatically functions and this system can be accessed via a web browser from a PC.

! Caution – Before connecting to the network

Carefully check if settings are correct before plugging into the network. A wrong setting may cause a failure in your network.

✔ Network connection

No network connection is made unless this setting is enabled even though a network cable is connected.

1 Display the [SETUP MENU: NETWORK] window.

2 Select the [NETWORK] checkbox in the [INTERNAL SERVER] area.

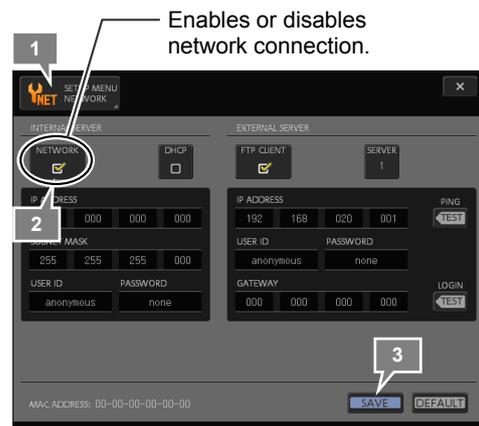
Select the checkbox to connect to the network. Clear it to disconnect from the network.

When the network connection is enabled, the HTTP server feature automatically functions and this system can be accessed via a web browser from a PC.

3 Press the [SAVE] button.

A confirmation message for saving the settings and a reboot request message for the motorized stand (if the setting has been changed) are displayed. Press the [OK] button to close the messages.

4 To switch the setting, turn off the motorized stand and then turn it on.



Enabling or disabling network connection

(2) Configuring how to obtain an IP address

Select a method for obtaining an IP address.

If the [DHCP] checkbox is selected, the system automatically obtains an IP address from a DHCP server on the network on startup.

1 Display the [SETUP MENU: NETWORK] window.

2 Select the [DHCP] checkbox in the [INTERNAL SERVER] area.

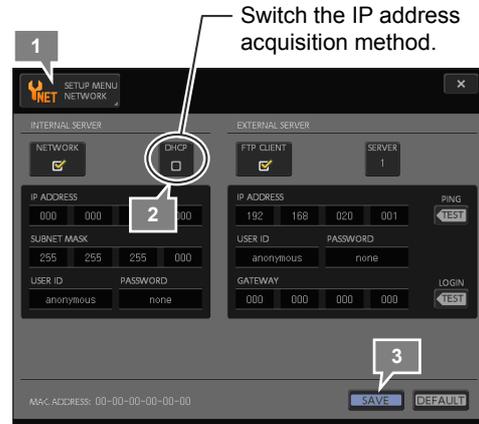
Select the checkbox to obtain an IP address from a DHCP server. Clear it to use a fixed IP address.

If this checkbox is selected, the [IP ADDRESS] and [SUBNET MASK] fields turn red and values cannot be input in these fields.

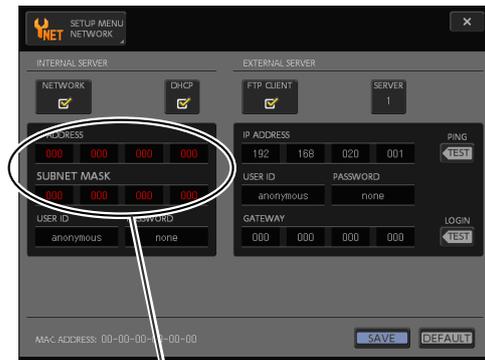
3 Press the [SAVE] button.

A confirmation message for saving the settings and a reboot request message for the motorized stand (if the setting has been changed) are displayed. Press the [OK] button to close the messages.

4 To switch the setting, turn off the motorized stand and then turn it on.



Configuring IP address acquisition



Numbers turn red. No values can be entered.

When DHCP is used

! Changing the IP address

Turn off and on the system when a method for obtaining an IP address was changed.

! Use of a DHCP server

In order to use a DHCP server, it must be running on your network. If using this system on a network where no DHCP server exists, clear the [DHCP] checkbox and use this system with a fixed IP address.

(3) Specifying a fixed IP address and a subnet mask

When a fixed IP address is used, you must manually enter an IP address and subnet mask.

Note: These values cannot be input if the [DHCP] checkbox is selected.

- 1 Display the [SETUP MENU: NETWORK] window.
- 2 Make sure the [DHCP] checkbox in the [INTERNAL SERVER] area is cleared.
- 3 Enter an IP address and subnet mask assigned by the network administrator into [IP ADDRESS] and [SUBNET MASK] fields.

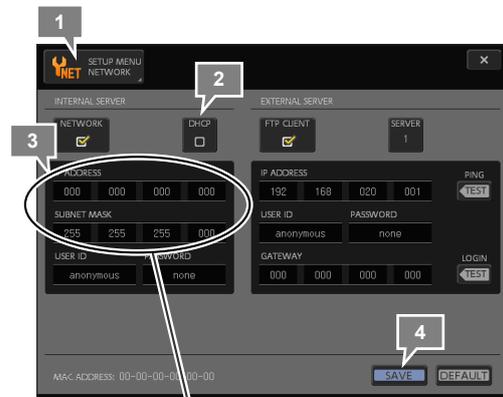
When each input field is pressed, a keypad appears. Press the desired key to enter a correct number and press the [ENTER] button.

Press the [CLR] button to erase the input. Press the [BS] button to backspace one character. Pressing the [X] button closes the keypad without changing the value.

- 4 Press the [SAVE] button.

A confirmation message for saving the settings and a reboot request message for the motorized stand (if the setting has been changed) are displayed. Press the [OK] button to close the messages.

- 5 To switch the setting, turn off the motorized stand and then turn it on.



Enter a valid IP address and subnet mask.

Specifying IP address and subnet mask

⚠ Changing the IP address

Turn off and on the system when changing a method for obtaining an IP address.

⚠ Specifying a fixed IP address

If a fixed IP address is to be used, consult the network administrator of your organization and specify the IP address and subnet mask officially given from the administrator. A wrong IP address may cause a failure in your network.

(4) Configuring authentication against web browser access

Specify whether to restrict access from a web browser by enabling user authentication.

- 1** Display the [SETUP MENU: NETWORK] window.
- 2** Specify a user name and password in [USER ID] and [PASSWORD]. The maximum number of characters for the user name and password is 10 characters.

When an input field is pressed, a keypad appears. Press the desired key to enter information and press the [ENTER] button.

Press the [Shift] button for switching upper and lower case. Press the [CLR] button to erase the input. Press the [BS] button to backspace one character. Pressing the [X] button closes the keypad without changing the value.

- 3** Press the [SAVE] button.

A confirmation message for saving the settings and a reboot request message for the motorized stand (if the setting has been changed) are displayed. Press the [OK] button to close the messages.

- 4** To switch the setting, turn off the motorized stand and then turn it on.



Enter a user name and password.
Configuring user ID and password

✔ When user authentication is no longer required

If user authentication is not to be used, empty both [USER ID] and [PASSWORD] fields. To explicitly specify that the user authentication is not required, enter “anonymous” in the [USER ID] field and “none” in the [PASSWORD] field.

⚠ User authentication for access from web browser

If accessing from a web browser to a system where user name and password are configured, the user authentication dialog box appears. If you fail to type correct user name and password, the system cannot be accessed.

8.3.2 Configuring FTP Client

- [EXTERNAL SERVER] Area -

The [EXTERNAL SERVER] area allows you to configure settings for connecting to an FTP server from this system and performs connectivity test against the FTP server.

(1) Enabling or disabling FTP client

Disables or enables use of FTP client feature.

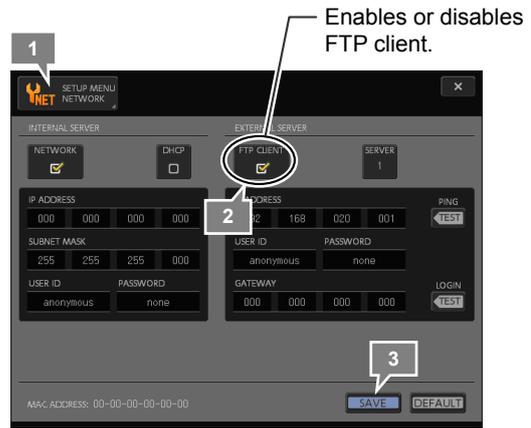
- 1** Display the [SETUP MENU: NETWORK] window.
- 2** Select the [FTP CLIENT] checkbox in the [EXTERNAL SERVER] area.

Select the checkbox to connect to an FTP server. Clear it if not using an FTP server.

- 3** Press the [SAVE] button.

A confirmation message for saving the settings and a reboot request message for the motorized stand (if the setting has been changed) are displayed. Press the [OK] button to close the messages.

- 4** To switch the setting, turn off the motorized stand and then turn it on.



Enabling or disabling FTP client

(2) Switching FTP server

Up to five FTP servers can be registered. Switch FTP server as required. A different FTP server can be used depending on who uses the system or types and usage of an object on an image.

1 Display the [SETUP MENU: NETWORK] window.

2 Press the [SERVER] button.

The [SERVER] submenu appears.

3 Press one of the [1] to [5] buttons to select the number of an FTP server to use.

The FTP server settings for the number are displayed: IP address, user ID and password.

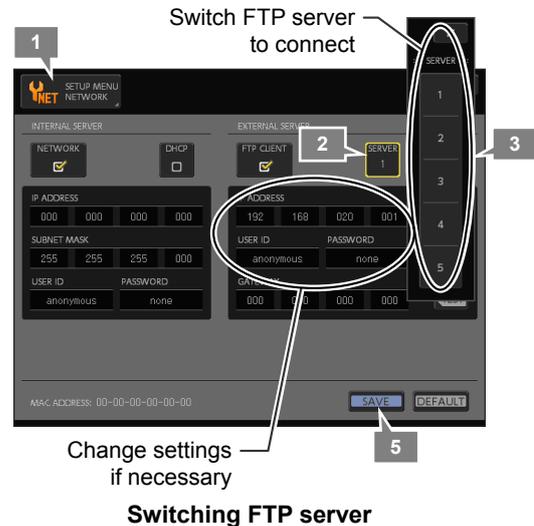
Note: The gateway setting is common to all servers.

4 To change the settings of the selected number, enter the necessary information in the [IP ADDRESS], [USER ID] and [PASSWORD] fields of the [EXTERNAL SERVER] area.

5 Press the [SAVE] button.

The server number selection is enabled and the new settings are stored with the server number.

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



(3) Configuring FTP server

1 Display the [SETUP MENU: NETWORK] window.

2 Press the [SERVER] button and select the number of FTP server to use.

The settings for the registered FTP server will be displayed: IP address, user ID and password.

3 Enter the IP address of the target FTP server in the [IP ADDRESS] field.

When an input field is pressed, a keypad appears. Press the desired key to enter a correct number.

4 Enter the user name and password for connecting to the FTP server in the [USER ID] and [PASSWORD] fields.

When an input field is pressed, a keypad appears. Press the desired key to enter information and press the [ENTER] button.

If the FTP server allows access from an anonymous user, enter “anonymous” for user name and set the password field blank.

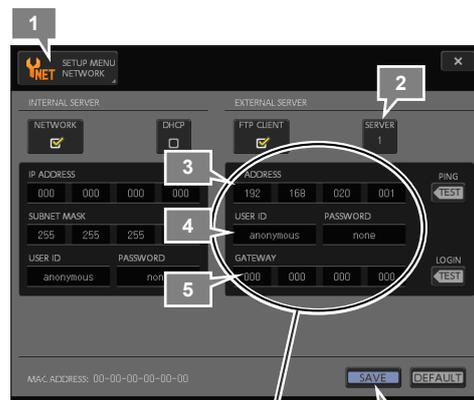
5 If the setting of a gateway is required, specify the IP address of the gateway in the [GATEWAY] field as specified by the network administrator.

When an input field is pressed, a keypad appears. Press the desired key to enter a correct number and press the [ENTER] button.

Note: The gateway setting is common to all servers.

6 Press the [SAVE] button.

The settings are stored with the server number and a confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Set values necessary for connection.

Configuring FTP server

✓ Configuring gateway

A gateway is a device for connecting different networks and allows proper communication between them. If your network is separated from another network with a gateway, you must specify the IP address of the gateway. Especially, to access an FTP server residing on a different network group, gateway settings are necessary.

(4) Connectivity test against FTP server

Perform connectivity test with an FTP server.

⚠ Before connectivity test

Prior to running a connectivity test, save the current settings using the [SAVE] button in the [SETUP MENU: NETWORK] window. If you fail to press the [SAVE] button, the network settings are not updated.

Connectivity test by PING

Tests if a target FTP server can be found on the network.

Press the [PING] – [TEST] button. A packet is sent to the IP address of the FTP server.

If the packet reaches the server and it returns a response, the message “COMPLETED” is displayed.



Connectivity test by PING

Note: The message “ERROR” is displayed if there is no response from the server within a predetermined time.

✔ When no response is returned for PING test

There may be no response to PING if security mechanism such as packet filter, firewall or security gateway is introduced. Restart ShuttlePix before disabling server’s security mechanism and retrying the test.

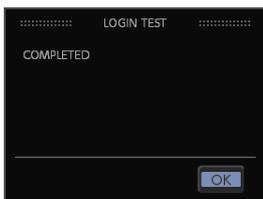
Even though no response is returned to PING, if you are sure you can login to the server by using [LOGIN] – [TEST] described below, connection to the FTP server has no problem.

Login test

Tests whether a target FTP server can be logged in to.

Press the [LOGIN] – [TEST] button to log in to the FTP server with the specified user name and password.

If login is successful, “COMPLETED” is displayed.



Perform login test for the FTP server.

Login test

Note: The message “ERROR” is displayed if the server denies login. If it is not possible to log in to the server, check settings of both this system and the server.

8.4 Changing Image File Settings

- [SETUP MENU: FILE] Window -

Select [FILE] using the [SETUP MENU SELECT] button on top left of the [SETUP MENU] window. The [SETUP MENU: FILE] window appears. On this screen, a folder can be automatically created when saving an image file and the file name can be set.

Items on [SETUP MENU: FILE] window

[SETUP MENU SELECT] button
Screen name is displayed. Pressing the button displays a submenu for switching menu screens.

[MEDIA DIR] area
Specify whether to automatically create a folder on a targeted recording medium.

[FTP DIR] area
Specify whether to automatically create a folder on a targeted FTP server.

Path Information area
Display a sample folder and file names in accordance with the settings.

[FORMAT] button
Format (initialize) a recording medium.

[X] (Close) button
Close Setup Menu screen.

[FILE NAME] area
Select whether an image file name is specified at every capture event, and set the convention and prefix for the automatically generated file name.

[DEFAULT] button
Restore settings of the screen to initial values

[SAVE] button
Save settings of the screen.

[SETUP MENU: FILE] window items

Area/Button	Content	Ref.
[MEDIA DIR] area [FTP DIR] area	Specify whether to automatically create a folder on a targeted recording medium or FTP server.	p.198
[FILE NAME] area	Select whether an image file name is specified at every capture event, and set the convention and prefix for the automatically generated file name.	p.199
Path Information area	Display a sample folder and file names in accordance with the settings.	p.198, p.199
[FORMAT] button	Format (initialize) a recording medium.	p.202

8.4.1 **Configuring Automatic Folder Creation**

- [MEDIA DIR] and [FTP DIR] Areas -

Specify whether to create a folder for saving an image file on a targeted recording medium or FTP server using the [MEDIA DIR] and [FTP DIR] areas respectively.

✔ Automatic creation of a folder

When an image is captured with the automatic folder creation set, a folder, whose name is generated in accordance with the capture date of the image, is automatically created in a storage folder in the recording medium or in the home folder in the FTP server. The image file is saved onto either of the folders.

The generated folder names are as follows. Files are automatically classified based on a date:

- **Recording medium:** "IM + Date (YYMMDD)"
- **FTP server:** "FT + Date (YYMMDD)"

If automatic folder creation is not used, an image file is saved directly in the topmost storage folder of the recording medium or in the home folder of the FTP server.

1 Display the [SETUP MENU: FILE] window.

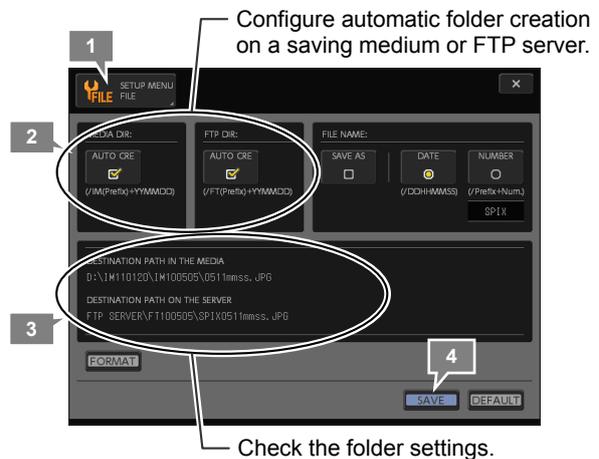
2 Select the [AUTO CRE] checkbox in the [MEDIA DIR] or [FTP DIR] area.

Select the checkbox to enable automatic folder creation. Clear it to disable automatic creation.

3 Check the current folder settings by looking at Path Information area.

4 Press the [SAVE] button.

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Configuring automatic folder creation

8.4.2

Configuring File Naming System and Convention

- [FILE NAME] Area -

In the [FILE NAME] area, specify whether image file names are set when capturing, and set the convention and prefix for the automatically generated file name.

(1) Setting the File Naming System

The [SAVE AS] checkbox in the [FILE NAME] area allows you to specify a file name every time an image is captured by pressing the [CAPTURE] or [CAPT] button in the [EASY MENU] or the [MAIN MENU].

Note: A file name cannot be set when an image is captured by pressing the [CAPTURE] button on the operation panel of the motorized stand. The image is saved with the automatically generated name.

1 Display the [SETUP MENU: FILE] window.

2 Select the file naming system for the image file using the checkbox in the [FILE NAME] area.

- **[SAVE AS]**
To specify a file name when capturing, select this checkbox, and to use the automatically generated file name, clear the checkbox.

For details on capturing an image when the [SAVE AS] checkbox is selected, see “[SAVE AS] window” on the next page.

3 Press the [SAVE] button.

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Setting the file naming system

✓ [SAVE AS] window

When the [SAVE AS] checkbox in the [FILE NAME] area is selected, pressing the [CAPTURE] or [CAPT] button in the [EASY MENU] or [MAIN MENU] displays the current image as a still image, and the [SAVE AS] window is displayed.

In the [SAVE AS] window, check the destination folder, image file name and image quality setting (of when the image is saved). To save the file, press the [SAVE] button and to discard the file, press the [CANCEL] button.

[FOLDER] field
Displays the folder set as the destination folder of the image to be saved.

[FILE] field
Displays the initial file name automatically set. To change the file name, enter a new file name (max. of 26 letters) using the keypad. A file extension is automatically added to the end of the file name.

[IMAGE QUALITY] buttons
Select the quality of the image to be saved from [TIFF], [FINE], [NORM] and [BASIC]. The file extension changes in accordance with the selection. ".TIF": when [TIFF] is selected ".JPG": when [FINE], [NORM] or [BASIC] is selected.

No button is displayed for a CSV file or an HDR intermediate file.



[Destination] button
Use this button to change the destination folder. Select the drive and folder as a destination and press the [OK] button in the [SAVE FOLDER] window.

Keypad
To change the file name, directly enter the file name from the keypad. To switch to upper-case letters, use [SHIFT], to delete one letter, use [BS] and to delete the entry, use [CLR].

[SAVE] / [CANCEL] button
To save the image, press the [SAVE] button, and to discard the image, press the [CANCEL] button.

Naming and saving an image when capturing ([SAVE AS] window)

Note: If the [SAVE MEDIA] checkbox in the [SETUP MENU: ADDITIONAL] window is not selected, the destination folder cannot be specified. For details on the procedure for changing the setting, see "8.5.2 Configuring Capture Function."

(2) Setting the naming convention for automatically generated file names

The [DATE] and [NUMBER] option buttons in the [FILE NAME] area allow you to specify the file naming convention for automatically generated image file names.

✔ File name convention

■ File naming convention

There are [DATE] setting based on capturing date and time and [NUMBER] based on a serial number.

- If set to [DATE], the file name is generated based on date and time of capturing. Prefix is not attached when saving in a recording medium.

Example: “DDHHMMSS.<extension>” (saving in a recording medium)
 “SPIX + DDHHMMSS.<extension>” (saving in a server)

- If set to [NUMBER], the file name is generated based on four-digit sequence number. If the name of the destination folder or file is changed, the sequence number is reset to “0001.”

Example: “SPIX + <four-digit-serial-number>.<extension>”

■ Setting prefix

An image file name starts with a fixed four-character prefix. Initial setting is “SPIX.” The prefix can be changed to arbitrary one.

Note: When set to [DATE], the prefix is not attached to the file saved onto a recording medium.

- 1 Display the [SETUP MENU: FILE] window.**
- 2 Select image file naming convention from the option buttons in the [FILE NAME] area.**
 - **[DATE]**
A file name is generated based on date and time of its capture.
 - **[NUMBER]**
A file name is generated by adding a four-digit sequence number to the prefix.

- 3 To change the file name prefix, enter a desired four-letter prefix in the prefix input field:**

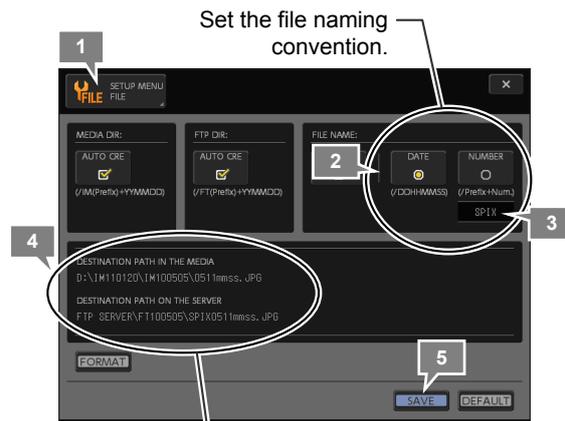
Press the input field. A keypad appears. Enter a desired prefix. Press [ENTER] to commit the value.

Note: When set to [DATE], the prefix is not attached to the file saved onto a recording medium.

- 4 Check the file name settings in the Path information area.**

- 5 Press the [SAVE] button.**

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Setting the file naming convention

8.4.3 Initializing Recording Medium

Initialize a recording medium using the [FORMAT] button.

- 1 Display the [SETUP MENU: FILE] window.
- 2 Press the [FORMAT] button.

The [DRIVE] submenu appears and lists drive icons. A drive icon is in white if a medium in it can be initialized or gray if the drive is empty.

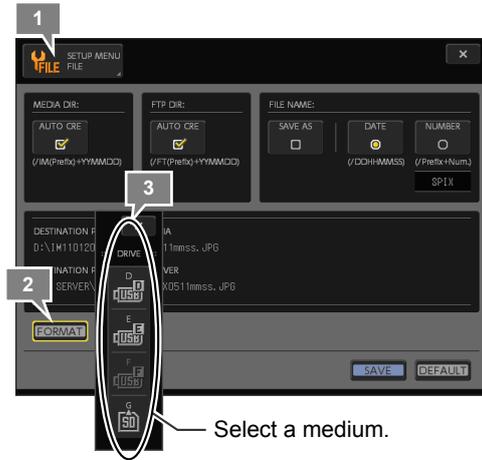
A recording medium connected through a USB connector is assigned drive D, E or F in the order of detection. An SD card within the P-400Rv/P-400R is always assigned to drive letter G.

- 3 Select a desired recording medium in one of drives D to G.

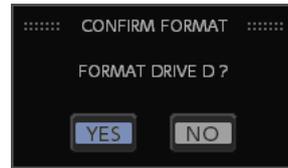
A confirmation message appears.

- 4 Press [YES] to initialize the medium, or [NO] to cancel the operation.

If [YES] is selected, the specified medium is initialized.



Initializing recording medium



Confirmation for formatting

✔ Initializing Drive G

Drive G indicates an SD card in the P-400Rv/P-400R. If an SD card is initialized with this system, the "DCIM" folder is created just below the root of the SD card and "100NIKON" folder is created in the "DCIM" folder.

These folders are used for saving images when the P-400Rv/P-400R is used standalone. It is necessary to initialize an SD card if it lacks these folders.

✔ In case of initialization failure

A recording medium with its write protect switch enabled cannot be initialized.

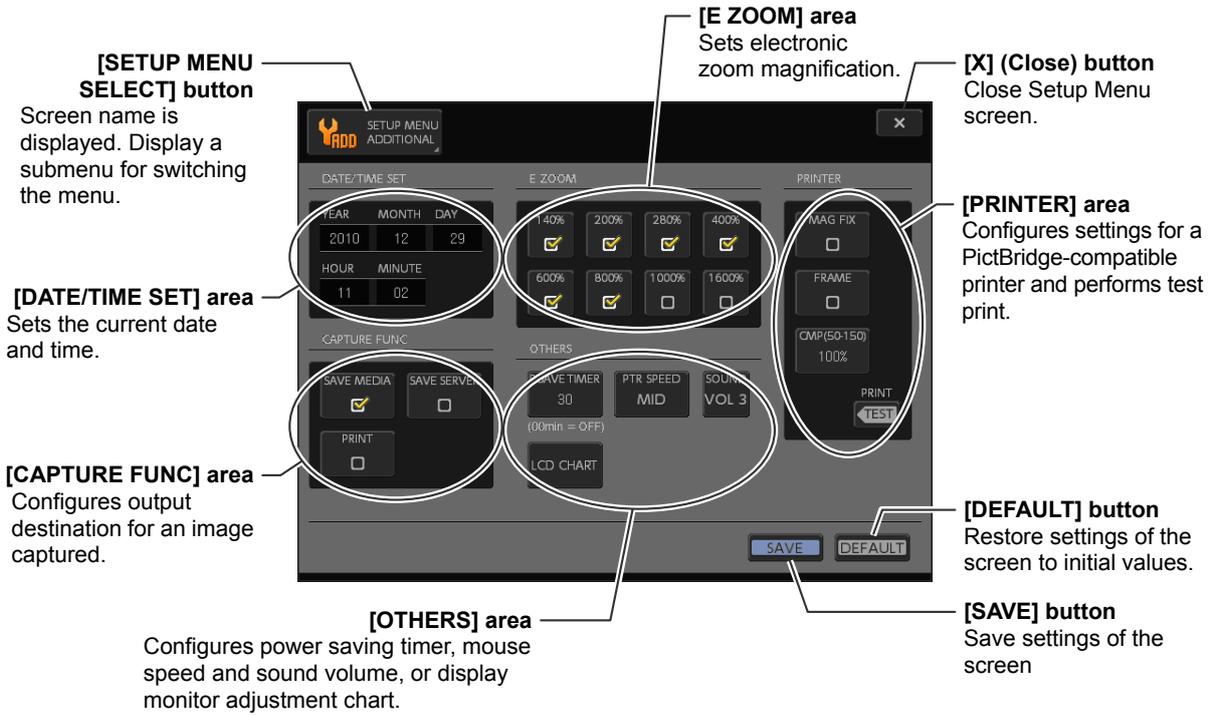
Initialization may fail if a recording medium has an error. A warning message indicating a medium error is displayed in this case.

8.5 Changing Overall Settings

- [SETUP MENU: ADDITIONAL] Window -

Select [ADD] (Additional) using the [SETUP MENU SELECT] button on the top left of the [SETUP MENU] window. The [SETUP MENU: ADDITIONAL] window appears. This screen allows you to configure various settings for handling this system.

Items in the [SETUP MENU: ADDITIONAL] window



[SETUP MENU: ADDITIONAL] window

Area	Description	Ref.
[DATE/TIME SET] area	Sets the current date and time.	p.204
[CAPTURE FUNC] area	Configures output destination for an image captured.	p.205
[E ZOOM] area	Sets electronic zoom magnification.	p.206
[PRINTER] area	Configures settings for a PictBridge-compatible printer and performs test print.	p.207
[OTHERS] area	Configures power saving timer, mouse speed and sound volume, or display monitor adjustment chart.	p.208

8.5.1 Setting Date and Time

- [DATE/TIME SET] Area -

In the [DATE/TIME SET] area, set the current date and time.

Internal clock of the system

The date and time are displayed on the right side of the status bar.

The internal clock of the system may fail to keep correct time in a few days while the main power cord is unplugged. Set the date and time immediately after the power is turned on. Set correct date and time especially when using automatic folder and file name generation since date and time are used for that feature.

- 1 Display the [SETUP MENU: ADDITIONAL] window.**
- 2 Set date and time in the [DATE/TIME SET] area.**

When each input field is pressed, a keypad appears. Press the desired key to enter a correct value. Press [ENTER] to commit the value.

Enter year, month, day, hour and minutes in two digits. For year, enter lower two digits of the year.

- 3 Press the [SAVE] button.**

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Setting date and time

Date and time setting in the P-400Rv/P-400R

When the power to the motorized stand with the P-400Rv/P-400R attached is turned on, the date and time setting in the P-400Rv/P-400R changes according to the date and time setting in the motorized stand.

In addition, when the date and time is set in the [SETUP MENU: ADDITIONAL] window, the date and time setting in the P-400Rv/P-400R is changed accordingly.

8.5.2 Configuring Capture Function

- [CAPTURE FUNC] Area -

Specify an action performed when capturing an image by operating the motorized stand or touch panel.

- 1** Display the [SETUP MENU: ADDITIONAL] window.
- 2** Specify an action performed when an image is captured in the [CAPTURE FUNC] area.

Select the action with the following checkboxes. More than one item can be selected.

- **[SAVE MEDIA] (Save to Media)**
An image file is saved on a recording medium attached to this system.
- **[SAVE SERVER] (Save to FTP Server)**
An image file is saved on an FTP server.
- **[PRINT]**
An image is printed on a printer connected to this system. It is not applied to interval shooting.

- 3** Press the [SAVE] button.

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Configure an action to be performed on capturing an image.

Configuring capture function

✔ Capture function

If all the checkboxes in the [CAPTURE FUNC] area are cleared, an alert message appears at the time of capturing.

✔ Print setting

The [PRINT] checkbox setting is disabled for interval shooting. The image captured by interval shooting is not printed.

8.5.3 Configuring Electronic Zoom Magnification

- [E ZOOM] -

In the [E ZOOM] area, set zooming levels of the electronic zoom used to enlarge or shrink a live or playback image. The electronic zoom can be used by an [E ZOOM] button found in the [MAIN MENU], [EASY MENU] [VIEW MENU] or [TOOL MENU].

✔ Electronic zoom

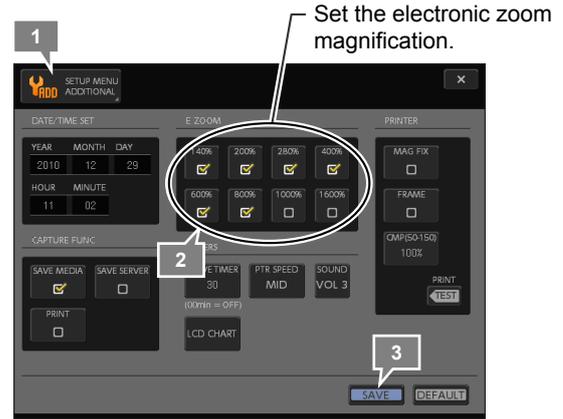
In electronic zooming, a real image is enlarged using digital image processing techniques.

- 1** Display the [SETUP MENU: ADDITIONAL] window.
- 2** In the [E ZOOM] area, select zooming levels to be made available by selecting the relevant checkboxes.

- **Electronic zooming levels**
140%, 200%, 280%, 400%, 600%, 800%, 1000% and 1600%

- 3** Press the [SAVE] button.

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Configuring electronic zoom magnification

8.5.4 **Configuring Printer Output**

- [PRINTER] Area -

In the [PRINTER] area, configure settings related to image output to a PictBridge-compliant printer.

- 1 **Display the [SETUP MENU: ADDITIONAL] window.**
- 2 **Configures printer output settings in the [PRINTER] area.**

Set the following items:

- **[MAG FIX] (fixed magnification) checkbox**

Switch print mode between “Normal” and “Real 10” mode. Checking the box sets Real 10 mode.

Normal mode

An image is enlarged or shrunk in an appropriate scaling ratio to fit on a printer form size of paper.

Real 10 mode

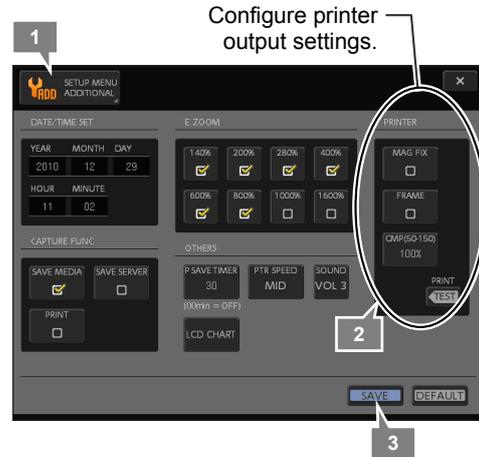
An image is printed in a fixed dimension with a fixed scaling ratio. The scaling ratio can be adjusted using the [CMP(50-150)] button. See “9.4.3 Setting Compensation (Only in Real 10 Mode)” for details on how to set this value.

- **[FRAME] checkbox**
Specify whether to print an image with a frame or border. Checking this box will print a frame.
- **[CMP(50-150)] button**
Specify a scaling ratio compensation value for printing an image in Real 10 mode. Press the button to display a keypad. Enter a desired compensation value and press [ENTER].
- **[PRINT - TEST] button**
Perform test printing. A scale is overlaid on a print output in order to help you determine Real 10 compensation value. The scale unit is in pixels.

Note: Test printing is not possible if an EDF, HDR, still (freeze) or playback image is displayed.

- 3 **Press the [SAVE] button.**

A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.



Configuring printer output setting

✔ **Print output**

- A scaling ratio used in printing depends on a printer model. To utilize the Real 10 printing, you must adjust (or compensate) the scaling ratio by actually checking print output on your printer.
- Only an image is printed. Other information such as a file name is not printed. The printer settings used (such as paper type and size) are what have been set in the printer. See the instruction guide for the printer for details.

✔ **PictBridge standard**

The PictBridge is an industrial standard defined by digital camera and printer manufactures for ensuring interoperation between a digital camera and printer. This standard allows you to print an image on a digital camera by directly sending it to a printer without requiring an intervening PC. See the official PictBridge site, <http://www.cipa.jp/pictbridge/>, for details.

8.5.5 Configuring Other Settings

In the [OTHERS] area, configure miscellaneous settings related to handling of this system.

- 1 Display the [SETUP MENU: ADDITIONAL] window.
- 2 The following settings can be done in the [OTHERS] area:

- **Configuring the power saving timer**
Specify time to wait before the system enters standby mode when it is not operated (initial setting: 30 minutes). Press the [P SAVE TIMER] button. A keypad appears. Enter a desired time (in units of minutes) and press the [ENTER] button to commit the value. Setting zero (00) disables power saving feature. In this case the system never enters standby mode however long the system remains not operated.
- **Setting the mouse speed**
Set movement speed of a mouse pointer if a mouse is connected to the system. Press the [PTR SPEED] button. The [PTR SPD] submenu appears. Select a desired speed from three levels of [LOW], [MID] (middle) and [HIGH] (initial setting: [MID]).
- **Configuring the sound volume**
Specify volume of operation sound of this system. Press the [SOUND] button to open a submenu. Select a desired volume level from seven levels of [OFF], [VOL 1] to [VOL 6] (initial setting: [VOL 3]).
- **Displaying the test chart**
Display a simplified test chart for adjustment of the monitors other than the P-TPM Touch Panel Monitor. 1 dot pitch black-and-white mesh chart is displayed. Adjust the clock phase and pitch on the display. See the instruction guide for the display for details on the adjustment. Automatic adjustment may be possible depending on the display. Press the [X] button at the top right of the test chart to close the chart and return to the [SETUP MENU: ADDITIONAL] window.

- 3 Press the [SAVE] button.

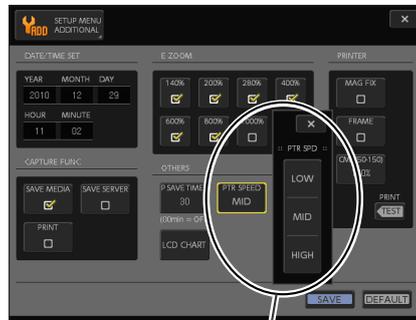
A confirmation message for saving the settings is displayed. Press the [OK] button to close the message.

■ Configuring the power saving timer



Set the time to wait before the system enters standby mode.

■ Setting the mouse speed



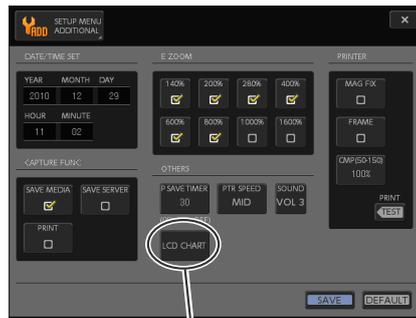
Set the mouse speed.

■ Configuring the sound volume



Set the operation sound volume.

■ Displaying the test chart



Display the test chart.

9

Direct Printing

This chapter describes how to connect a PictBridge-compliant printer to this system and to print out images from a printer.

9.1 Configuring the Operating Mode for USB Ports

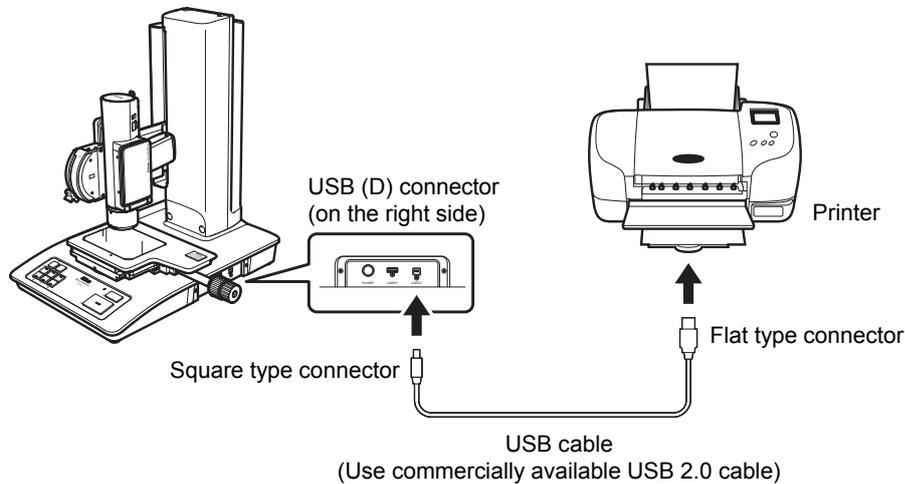
In order to connect a printer, operating mode for the USB (D) connectors of this system should be [PRINTER]. Change the USB mode if necessary. See “8.2.3 Configuring USB (D) Connector Operating Mode” for details.

Mode	Description
PC	To retrieve captured images from a dedicated application installed on a PC
Printer	To connect a PictBridge-compliant printer to the system

Note: The factory-default setting for the operation mode of the USB (D) connector is [PC].

9.2 Connecting PictBridge-Compliant Printer

To connect a PictBridge-compliant printer, use a commercially available USB cable and connect to the USB (D) connector on the right side of the motorized stand.



Connecting a printer

✔ PictBridge standard

The PictBridge is an industrial standard defined by digital camera and printer manufactures for ensuring interoperability between a digital camera and printer. This standard allows you to print an image on a digital camera by directly sending it to a printer without requiring an intervening PC. See the official PictBridge site, <http://www.cipa.jp/pictbridge/>, for details.

✔ Error on the printer

Printing operation does not complete in the ShuttlePix if an error, such as out of paper, occurs in the printer. Canceling printing from the printer will end printing in the ShuttlePix. Take necessary actions, such as supplying paper, etc., and try printing again.

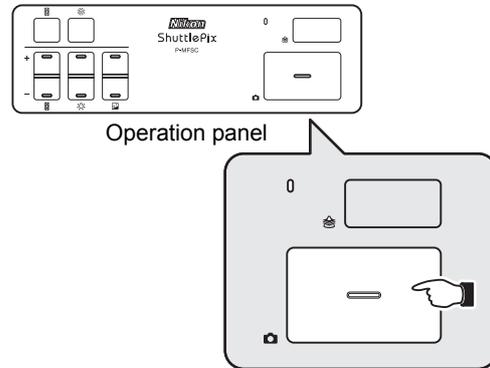
9.3 Printing an Image

In this system, a live image can be printed directly or saved image can be printed later.

9.3.1 Directly Printing a Live Image

When capturing an image using the motorized stand or touch panel, the live image can be printed directly in a printer.

It is necessary to change the settings on the setup menu in order to print a captured image at the same time the image is shot. See “8.5.2 Configuring Capture Function” for details on how to change the settings.



Printing while capturing live image

✔ Actions taken in capturing an image

With settings in the [CAPTURE FUNC] area in the [SETUP MENU: ADDITIONAL] window, a live image can be saved on a recording medium or an FTP server while being printed, or can be printed without saving the image.

✔ Printing in interval shooting

Printing is not available for interval shooting.

9.3.2 Printing a Saved Image

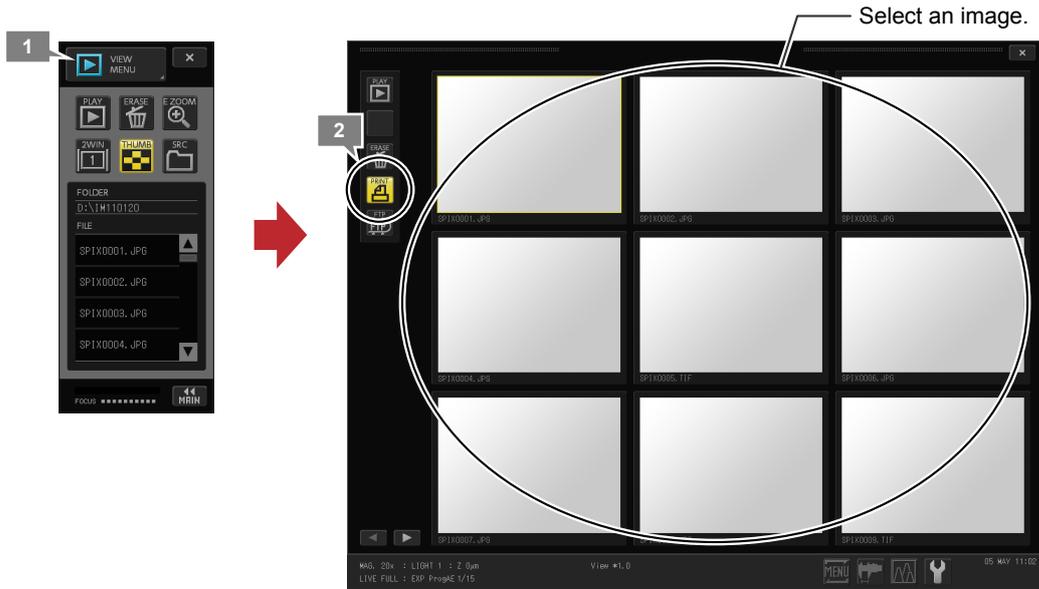
Print an image saved onto a recording medium.

- 1 Select a desired folder in the [VIEW MENU] to open the [THUMBNAIL] window.**

Image files in the selected folder are listed.

- 2 Select a desired image and press the [PRINT] button.**

The selected image data is sent to the printer.

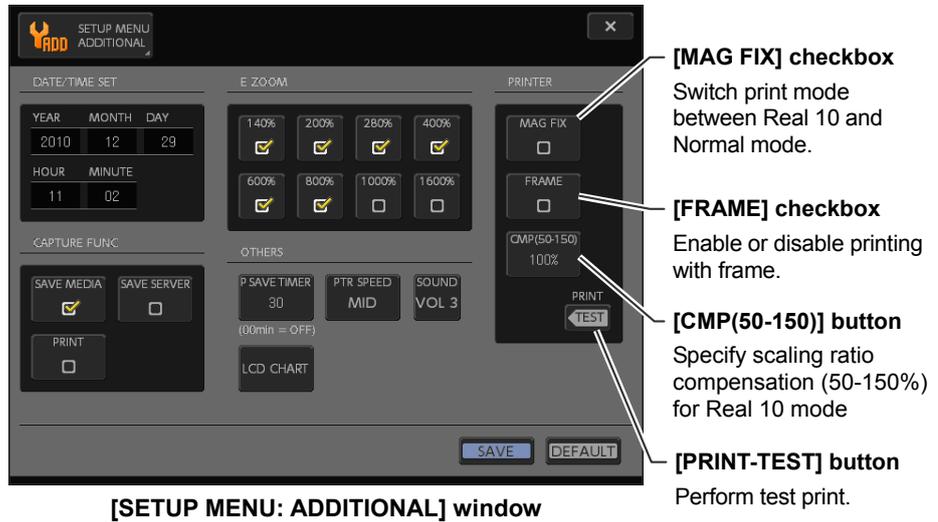


Printing a saved image

9.4 Changing Print Settings

Print settings can be done in the [PRINTER] area in the [SETUP MENU: ADDITIONAL] window. There are the following settings.

- **Selecting Print Mode (Real 10 or Normal Mode)**
- **Enabling or Disabling Printing with Frame**
- **Setting Compensation (Only in Real 10 Mode)**



9.4.1 Selecting Print Mode (Real 10 or Normal Mode)

Select the [MAG FIX] (Real 10) checkbox to switch between the “Real 10” and “Normal” mode. The print mode is normal if cleared, or Real 10 if selected.

- **Normal mode**
An image is printed in a size that fits the printer paper form.
- **Real 10 mode**
An image is printed in a size specified using the [CMP(50-150)] (compensation) button. By compensating scaling factor (between 50% and 150%), the size of the object being printed can be precisely controlled.

9.4.2 Enabling or Disabling Printing with Frame

The [FRAME] checkbox allows you to specify whether to add a frame (or edge) when printing. Checking the box enables printing with a frame.

✔ **Printing with a frame**

The frame function may not be available depending on the printers. In this case, even though the [FRAME] checkbox is selected, printing is performed without a frame.

9.4.3 Setting Compensation (Only in Real 10 Mode)

To adjust the printing magnification used in printing in the Real 10 mode, follow the procedures below.

- 1 Press the [PRINT-TEST] button to print an imaged object.**

An image with the overlaid scale in pixels is printed.

- 2 Physically measure the dimension of the scale.**

Example: Measure the distance between 0 and 500 pixels.

- 3 Use the following conversion formula to calculate dimension of the scale on the object from reading of the scale (in pixels).**

Conversion formula

- Dimension of scale on object

$$= \frac{\text{Reading of scale (in pixels)} \times 10 \text{ (pixel size when zoom 1x)}}{\text{Zoom magnification}}$$

Conditions: Reading of scale is 500 pixels. The pixel size when 1x zoom is 10 μm.

Zoom magnification	Dimension of scale on object
1x	500 pixels × 10 μm / 1 = 5000 μm (5 mm)
4x	500 pixels × 10 μm / 4 = 1250 μm (1.25 mm)
8x	500 pixels × 10 μm / 8 = 625 μm (0.625 mm)
16x	500 pixels × 10 μm / 16 = 312.5 μm (0.3125 mm)
20x	500 pixels × 10 μm / 20 = 250 μm (0.25 mm)

- 4 Press the [CMP(50-150)] button and enter scaling ratio compensation value. The compensation value can be calculated as: Dimension of the scale on the printed paper ÷ Dimension of the scale on the object = Desired magnification factor.**

Press the button. A keypad appears. Enter a desired number and press the [ENTER] key.

- 5 Repeat steps 1 to 4 and obtain a more precise value.**

After the setting, press the [SAVE] button to save the compensation value.



Setting scaling ratio compensation

✔ Note for test printing

Test printing is not possible if an EDF, HDR, still (freeze) or playback image is displayed.

10

Connecting with PC

This chapter describes how to use the system connected to a PC.

10.1 Connecting with a PC

10.1.1 Configuring the Operating Mode for USB Ports

In order to connect with a PC, operating mode of the USB (D) connectors of the system should be set to [PC]. Change the USB mode if necessary. See “8.2.3 Configuring USB (D) Connector Operating Mode” for details.

Mode	Description
PC	To retrieve captured images from a dedicated application installed on a PC
Printer	To connect a PictBridge-compliant printer to the system

Note: [PC] is set by factory default.

10.1.2 Connecting with a PC

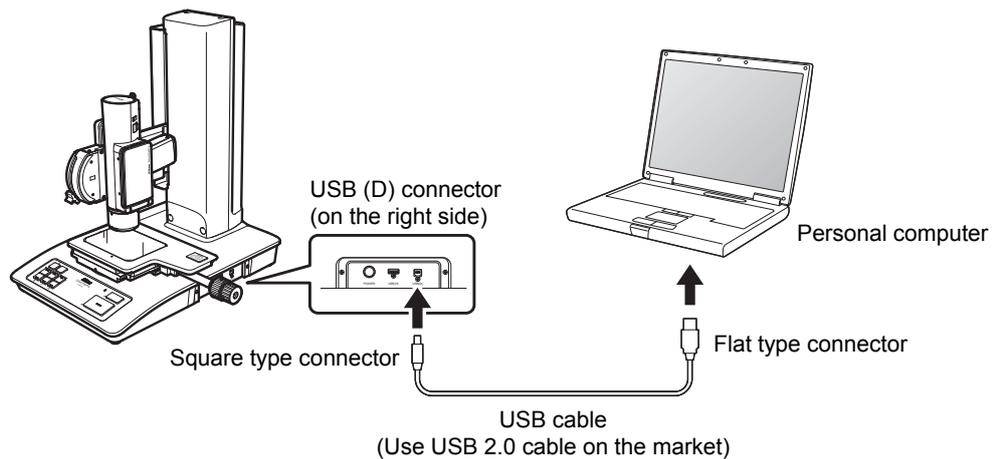
Use a commercially available USB cable (USB 2.0 compatible) to connect this system with a PC.

- 1 Turn off the system.
- 2 Start the PC.
- 3 Use a commercially available USB cable (USB 2.0 compatible) and connect a USB port on the PC with a USB (D) connector on the right side of the motorized stand.
- 4 Turn on the system.

The indicator of the operation panel lights. When the power to this system is turned on, the PC will recognize the connection to the system.

- 5 Use the ShuttlePix Editor to transfer image files.
- 6 When file transfer is complete, turn off the system and disconnect the PC.

Turn off the system before disconnecting the USB cable.



Connecting to a PC

❗ Connecting a USB cable

- When connecting a USB cable, be careful about orientation of the connector. Do not push the connector too hard.
- Do not use a USB hub between the system and the PC.

10.2 Using the ShuttlePix Editor

The “ShuttlePix Editor” is a free application program provided by Nikon.

How to obtain the ShuttlePix Editor

To obtain the ShuttlePix Editor, access the following site using a web browser connected to the Internet:

- <http://nikon.com/products/instruments/support/index.htm>

✔ Use Environment for the ShuttlePix Editor

Required environment for the ShuttlePix Editor is as follows. See the ShuttlePix Editor Instructions for details on how to install the application:

- Windows 7
- Windows XP Service Pack 3

Notes:

- The quick view function can be used only on Windows 7. It cannot be used on Windows XP.
- Required environment may change without notice. See the instruction guide attached to the software for details.

Using the ShuttlePix Editor

The ShuttlePix Editor allows you to use the following functions on images captured by this system.

- **Image import**
Import images captured by this system.
- **Image processing**
Adjust white balance, contract, etc.
- **2D measurement**
Measure distance, angle, area, etc. on a two-dimensional image. The measurement results of this system can be edited.
- **3D display**
Display an image in a format such as texture, contour, shading, transparency, etc. based on an EDF image. Displays cross section of the EDF image and measures height and width. Compensates a 3D shape created from the EDF image.
- **Printing of image list**
Print multiple imported images.

Note: See the ShuttlePix Editor Instructions for details on how to use the ShuttlePix Editor.

10.3 Using the Quick View Function

When the ShuttlePix Editor is started on a PC connected to this system using a commercially available USB cable, the quick view function can be used to display images captured by this system on the ShuttlePix Editor screen in real time.

By using the quick view function, the following operations are made available:

- High-definition images captured on this system can be displayed on the ShuttlePix Editor screen in real time.
- When an EDF image is displayed with the 3D image generation data set to be output, the 3D image can be displayed on the ShuttlePix Editor screen in real time.

The quick view function is set in the ShuttlePix Editor. For details, see the instruction manual for the ShuttlePix Editor.

✔ Use Environment for the quick view function

The quick view function can be used only on Windows 7. It cannot be used on Windows XP.

11

Connecting to Network

This chapter describes how to use the system with a PC connected to a network.

11.1 Things You can Do with Network

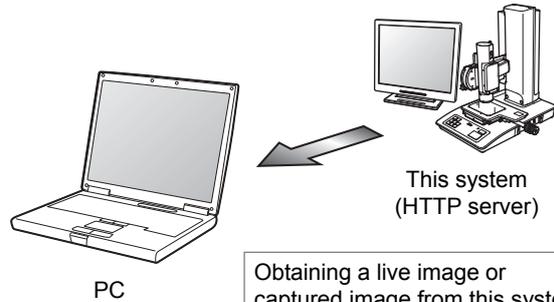
When connecting this system to the PC network (LAN: Local Area Network), the following operations are available via the network.

Obtaining images on a PC with web browser

Images can be acquired with this system worked as an HTTP server using a web browser on a PC on a network. See “11.3 Obtaining Images by Web Browser” for details.

- **Acquiring a live image.**
- **Acquiring a captured image.**

Note: The nominal maximum number of web browsers that can simultaneously connect to this system and display images from the system is four although the actual limit depends on how frequently the images are updated.



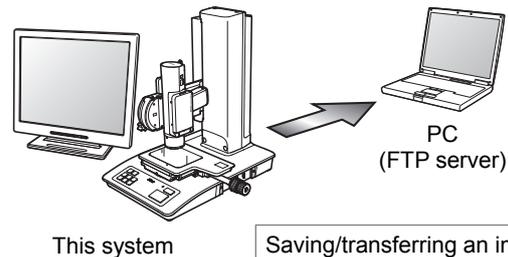
Obtaining a live image or captured image from this system using a web browser on a PC

Transferring images to an FTP server

Images can be transferred to a PC (FTP server) on the network using the FTP client feature of this system. See “11.4 Transferring Image to FTP Server” for details.

- **Transfer an image to an FTP server when it is captured.**
- **Transfer the images already captured to the FTP server.**

Note: Up to five FTP servers can be specified. Images can be transferred to an individual folder by registering different login users.



Saving/transferring an image in/to a PC (FTP server) using this system

⚠ Network settings

It is necessary to configure network-related settings correctly in order to connect this system to the network. Before doing so, be sure to consult the network administrator of your organization for correct setup information.

See “11.2 Configuring Network” for details on how to configure network-related settings. See “8.3 Configuring Network Settings” for network setting items.

11.2 Configuring Network

It is necessary to configure this system correctly to fit your network environment in order to connect this system to the network.

Network settings on a PC

This document assumes PC-side network configuration is complete. Consult the network administrator of your organization for details on the network configuration.

11.2.1 Items to Check in Advance

Check the following items before connecting this system to the network.

Network environment

PC OS and web browser

(1) Network environment

Verify the following items with your system administrator before configuring the network.

- Whether use of the FTP on LAN is permitted (if it is planned to use the FTP)
- Whether Image transfer on LAN is permitted
- IP address management scheme
 - Whether use of a fixed IP address is permitted
 - Whether the DHCP server is running (if it is planned to obtain an IP address automatically)

Obtaining a fixed IP address

- Assignment of a fixed IP address to this system is recommended if it is planned to use a PC web browser to access this system. Consult the network administrator of your organization if it is planned to use a fixed IP address.
- The subnet mask and gateway address can be determined if a fixed address is obtained.
- You may need to report the MAC address of a product in order to apply for an IP address. The MAC address of this system is displayed in the [SETUP MENU: NETWORK] window.

Use of DHCP server

If this system is configured to use automatic address acquisition from a DHCP server, the IP address of this system may dynamically change. You may need to use a different IP address at a different time in order to access this system from a web browser. The IP address of this system is displayed in the [SETUP MENU: NETWORK] window.

(2) PC OS and web browser

When a web browser is used

Use a PC with the following recommended OS and web browser if it is planned to access this system from a web browser on a PC.

- **Windows**
 - Windows 7, XP SP3
 - Internet Explorer 9.0 or later, or Firefox 3.6 or later
- **Macintosh**
 - Mac OS X 10.6 or later
 - Safari 5.0 or later, Firefox 3.6 or later

When an FTP server is used

In order to transfer images from this system to an FTP server, a PC is necessary and FTP server functionality must be configured in it. Make sure your server PC has one of the following OS installed.

- **Windows**
 - Windows 7, XP SP3

✔ **FTP server functionality on Windows**

You must install the FTP server component on Windows 7 or XP. Check if the component is already installed as well as the type of OS installed.

- **Macintosh**
 - Mac OS X 10.6

✔ **Mac OS X 10.7 or later versions**

Access from this system to a computer installed with Mac OS X 10.7 or later versions using an FTP server is not supported. Nikon recommends using Mac OS X 10.6 or earlier versions.

Note: Access from a computer with the Mac OS X 10.7 or later versions to this system using a web browser is supported.

11.2.2 Configuring Network Settings

This section describes the settings required to connect this system to the network.

✔ Example settings in this document

This section uses the following settings as an example. See “8.3 Configuring Network Settings” for details of each item.

- **IP address acquisition:** Fixed
- **IP address of this system:** 192.168.10.2
- **IP address of the FTP server:** 192.168.10.1
- **Subnet mask:** 255.255.0.0
- **Gateway:** 192.168.128.1

IP addresses are different depending on the environment. Use IP addresses assigned by the network administrator of your organization in setting up your system.

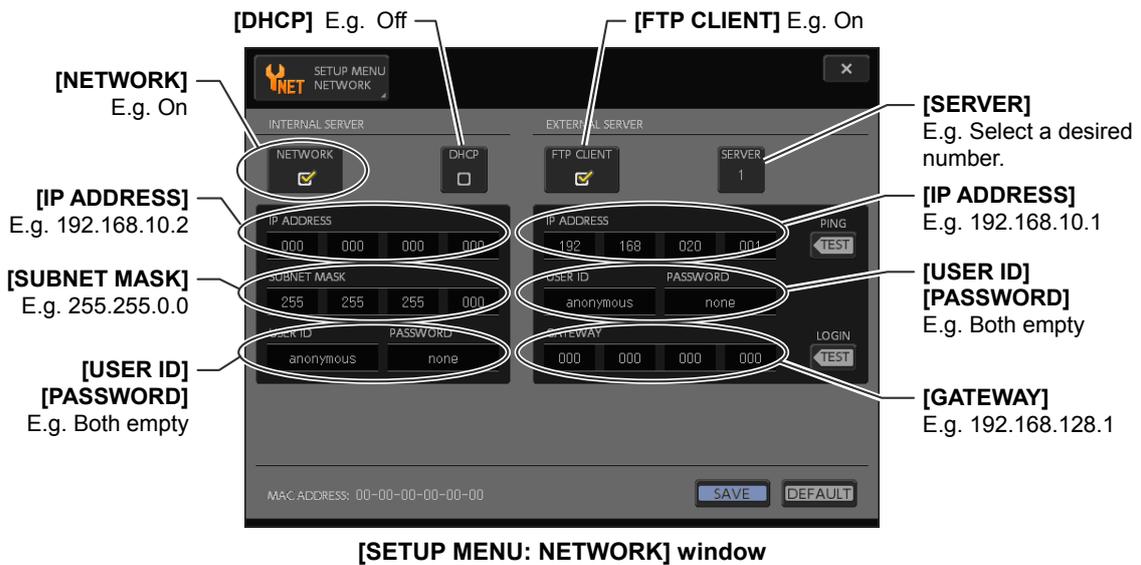
Configure the network in the [SETUP MENU: NETWORK] window.

1 Display the [SETUP MENU: NETWORK] window.

Press the [SETUP MENU] button on the status bar. Use [SETUP MENU SELECT] to switch the screen to [SETUP MENU: NETWORK].

2 Follow example below to set each item.

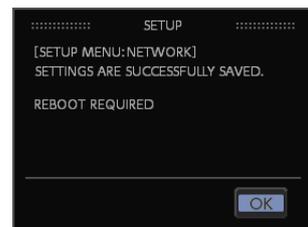
3 Press the [SAVE] button to save settings.



✔ Changing network configurations

System power may have to be turned off and on to enable changes to some network-related settings of this system.

In this case, a confirmation message for saving the setting and the alert message “REBOOT REQUIRED” are displayed when the [SAVE] button is pressed in the [SETUP MENU: NETWORK] window.



⚠ In connecting to the network

When connecting to the network, configure required settings before you turn on [NETWORK].

11.2.3 Connecting to the Network

There are two ways for connecting to the network.

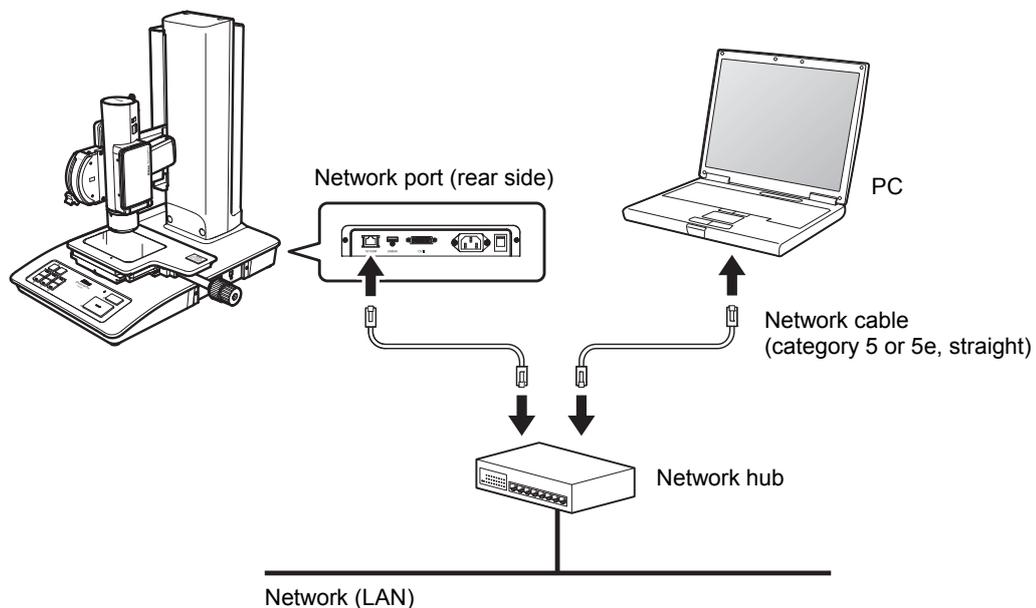
- (1) Connecting to a LAN via a network hub.
- (2) Directly connecting to a PC without going through a LAN.

! Network cable

- Use a 10/100Base-TX cable (Category 5 or 5e) for network connection.
- Use a shielded network cable to satisfy the EMC standards.
- Use a straight cable to connect to a LAN. Use a cross cable to directly connect to a PC.

(1) Connecting to LAN via a network hub

Connect to your network (LAN) via a network hub. Connect the network cable, referring to the following figure.

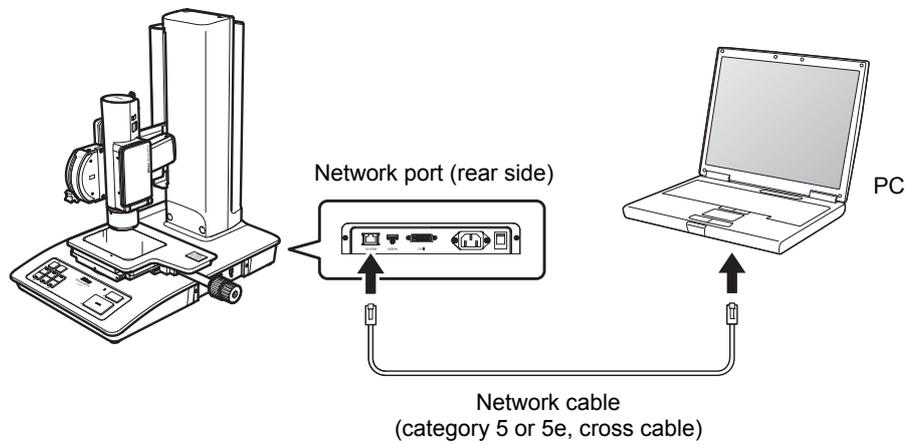


! Before connecting to the network

Before connecting to the network, configure network settings correctly in accordance with the configuration of the network you are going to connect to. Consult the network administrator of your organization for details.

(2) Directly connecting to PC without going through LAN

Use a cross-wired network cable to directly connect a PC and the system without using a network hub.



⚠ IP address settings

Use a fixed IP address for both the PC and this system when connecting them directly using a cross cable.

11.3 Obtaining Images by Web Browser

The following operations can be done when a web browser is used to access this system.

- **Obtaining a live image**
Observe the preview of a live image on the PC and save the image into the PC if necessary.
- **Downloading a captured image**
Download an image stored in a recording medium onto a PC.

! Number of access for viewing live image

The nominal maximum number of PCs (web browsers) that can simultaneously connect to this system and display images from the system is four although the actual number may vary depending on how frequently the images are updated.

11.3.1 Configuring PC and Web Browser

This section describes the PC and web browser settings for accessing this system. The following settings are required:

- (1) **Changing firewall settings**
- (2) **Changing proxy server settings**
- (3) **Enabling Java applets**

(1) Changing firewall settings

In order to protect from unauthorized entry to a PC, OS and virus protection software include firewall functionality.

If firewall functionality is enabled, exclude reception at a UDP port number “52102” from the protection list. This port number is used by this system.

See help for your OS or document for your virus protection software on how to configure the settings.

! Firewall settings

No communication can be done between the system and PC unless you change the firewall settings. Be sure to change the settings.

(2) Changing proxy server settings

When connecting from a web browser to this system, disable the use of a proxy server.

Examples for Internet Explorer and Firefox on Windows are presented here. If it is planned to use other OS or web browser, use the following examples as a guide.

Proxy server settings

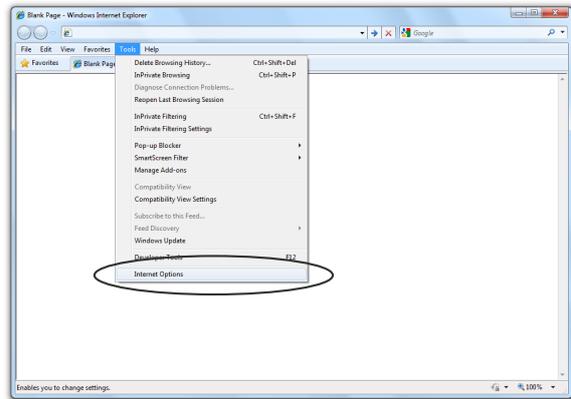
No communication can be done between the system and PC unless you change proxy server settings. Be sure to change the settings.

Internet Explorer

1 Start Internet Explorer on your PC.

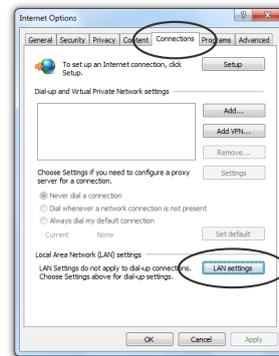
2 Select [Internet Options] from the [Tools] menu.

A dialog box appears.



3 Select the [Connections] tab and click the [LAN Settings] button.

The [Local Area Network (LAN) Settings] dialog box appears.



4 Click the [Advanced] button.

If the [Advanced] button is disabled, select the [Use a proxy server for your LAN] checkbox.

The [Proxy Settings] dialog box appears.

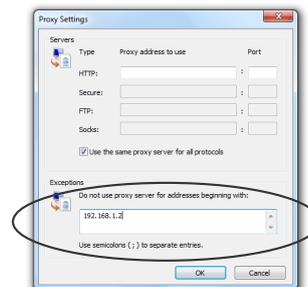


5 Write the IP address of this system in the [Exceptions] field.

Enter a dot (period) per three-digit IP address component. If the component starts with "0" or "00," skip "0" or "00" and enter the IP address.

6 Click [OK] for every open dialog box to close the dialog boxes.

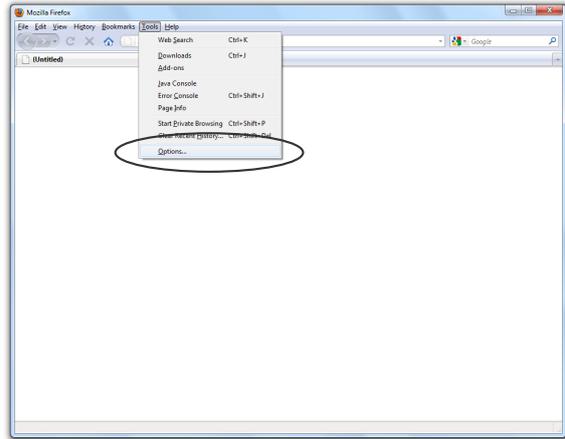
The settings are enabled.



Firefox

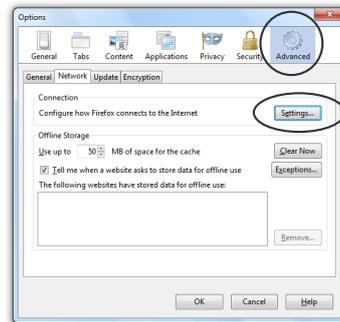
- 1 Start Firefox on your PC.
- 2 Select [Options] from the [Tools] Menu.

The [Options] dialog box appears.



- 3 Select [Advanced] and click [Settings] on the [Network] tab.

The [Connection Settings] dialog box appears.

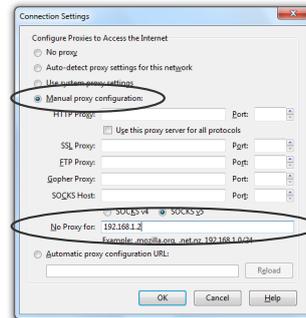


- 4 Select [Manual proxy configuration].
- 5 Write the IP address of this system in the [No Proxy for:] field.

Enter a dot (period) per three-digit IP address component. If the component starts with "0" or "00," skip "0" or "00" and enter the IP address.

- 6 Click [OK] for every open dialog box to close the dialog boxes.

The settings are enabled.



(3) Enabling Java applets

In order to view a live image of this system from a web browser, it is necessary to enable execution of Java applets on web browser.

Examples for Internet Explorer and Firefox on Windows are presented here. If it is planned to use other OS or web browser, use the following examples as a guide.

❗ Installing the latest version of Java on Windows

In order to view a live image of this system from a web browser, Java in version 7 or later must be installed on a PC. If Java is not installed on your PC, follow the procedures below to install Java in version 7 or later.

1 Connect your PC to the Internet and start web browser.

It is necessary to connect your PC to the Internet in order to install Java.

2 Access the following site with a web browser and download the Java installation file.

- <http://www.java.com/en/download/>

3 Execute the downloaded file and install Java.

Follow instructions on the screen to install Java.

Note 1: If it is planned to connect this system and PC with a cross cable, or you are going to use this system on a network without Internet connection, complete Java installation in an Internet-connected environment beforehand.

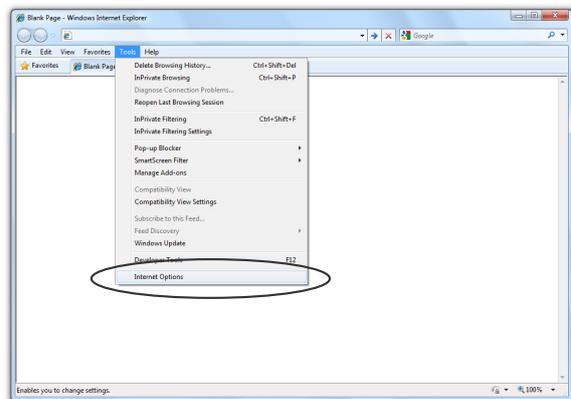
Note 2: On Macintosh, Java is automatically installed in Mac OS X 10.6 when the OS is setup. Upgrade it to the latest version as needed. Java is not initially installed in Mac OS X 10.7 or later versions. Open Java Preferences in the Utilities folder and install the latest version.

Internet Explorer (Windows)

1 Start Internet Explorer on your PC.

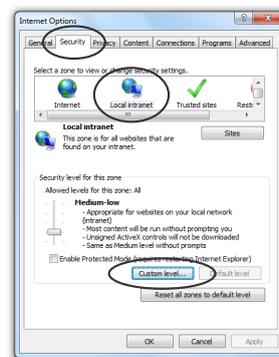
2 Select [Internet Options] from the [Tools] menu.

The [Internet Options] dialog box appears.



3 Select [Local Intranet] in the [Security] tab and click the [Customize Level] button.

The [Security Settings – Local Intranet Zone] dialog box appears.



11 Connecting to Network

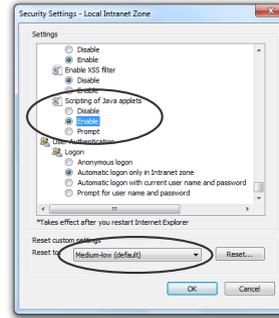
4 Configure [Java VM].

Enable Java execution by selecting any security level of [High], [Medium-High] or [Medium].

Set [Scripting of Java Applets] in [Settings] to [Enable].

5 Click [OK] for every open dialog box.

The settings are enabled.

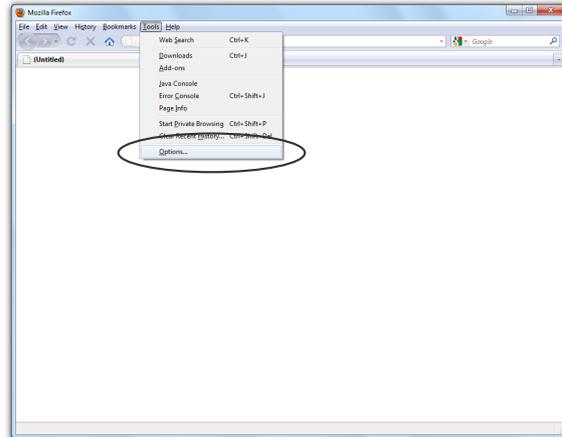


Firefox (Windows)

1 Start Firefox on your PC.

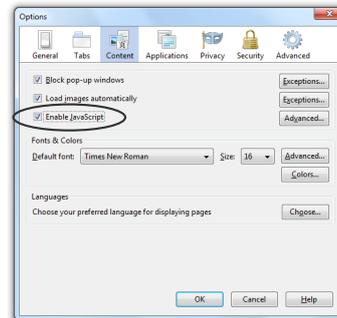
2 Select [Options] from the [Tools] menu.

The [Options] dialog box appears.



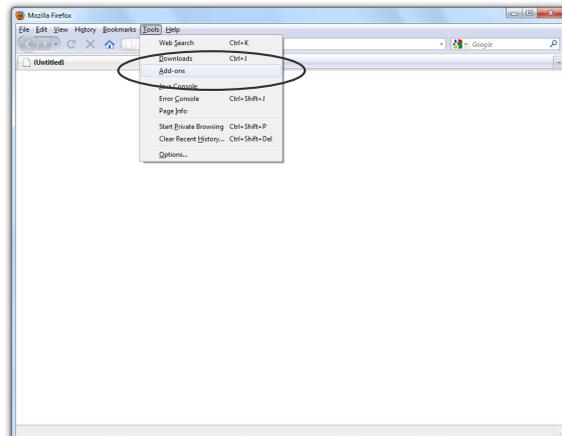
3 Open the [Content] tab in the [Options] dialog box and select the [Enable JavaScript] checkbox.

4 Click [OK] to close the dialog box.



5 Select [Add-ons] from the [Tools] menu.

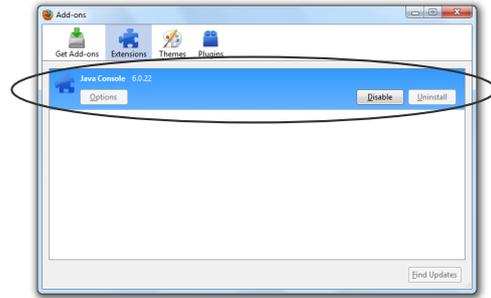
The [Add-ons] dialog box appears.



- 6** Open the [Advanced] tab of the [Add-ons] dialog box and make sure [Java Console] is enabled.

If [Java Console] is not displayed, install Java.

- 7** Click [OK] to close the dialog box.



Safari (Macintosh)

- 1** Start Safari on your PC.
- 2** Select [Preferences] from the [Safari] menu.

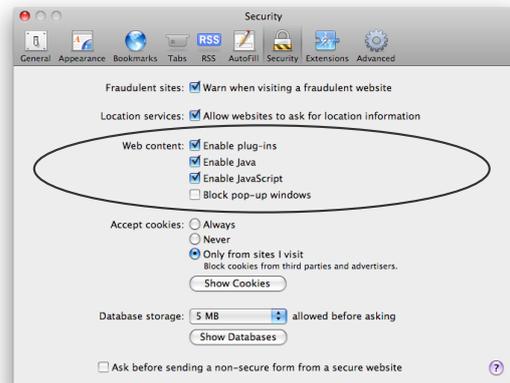
- 3** Select [Security].

Click a top right button if the [Security] icon is not displayed.

- 4** Select the following checkboxes:

- [Enable plug-ins]
- [Enable Java]
- [Enable JavaScript]

- 5** Click the close button to close the dialog box.



Firefox (Macintosh)

- 1** Start Firefox on your PC.
- 2** Select [Preferences] in the [Firefox] menu.

- 3** Select [Content].

Click the top right button if the [Content] icon is not displayed.

- 4** Select the [Enable JavaScript] checkbox.

- 5** Click the close button to close the dialog box.



11.3.2 Operating Web Screen

Access the IP address of this system from your web browser to display the web screen of this system. The following operations on the web screen are available.

- **Obtain a live image ([ROOM1] window)**
Preview a live image on your PC and save the live image on your PC if necessary. This operation is available if one of the following combinations of OS and web browsers is being used.
- **Download captured images ([ROOM2] window)**
Download images stored on a recording medium into your PC.

Required environment for the [ROOM1] window

The [ROOM1] window works in the following environment. It may not be displayed properly on other environments.

OS	Web Browser
Windows 7, XP SP3 or later	Internet Explorer 9.0 or later, or Firefox 3.6 or later
Mac OS X 10.6 or later	Safari 5.0 or later, or Firefox 3.6 or later

Java applets must be enabled to use [ROOM1].

(1) How to connect to the system

Connect to this system from your web browser and display the web screen of this system.

- 1 Start web browser on your PC.**
- 2 Enter the IP address of this system in the URL address field of web browser (example: http://192.168.10.2/)**

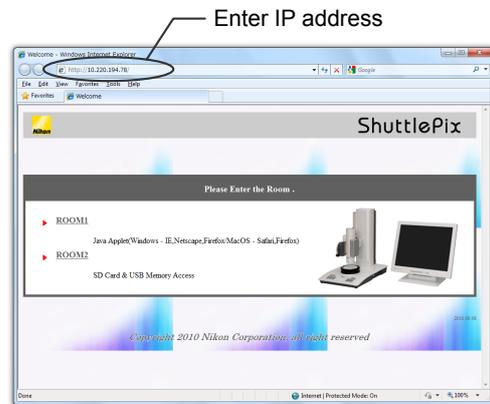
The entrance screen appears on the web browser window if connection is successful.

- 3 Start web operation.**

Operations are done in [ROOM1] or [ROOM2]. Select the desired tab.

- **[ROOM1] tab**
A live image can be viewed. The live image is updated in a predetermined interval.
- **[ROOM2] tab**
An image file stored in a recording medium can be downloaded to your PC.

- 4 End web browser when the operations are finished.**



Entrance screen

[ROOM1] tab

- A live image will not be displayed on the [ROOM1] tab unless the latest version of Java is installed.

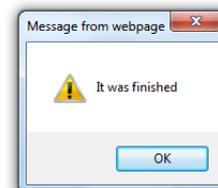
Notes

- This system cannot be accessed from multiple web browsers running on one PC at one time.
- The web screen response may slow down if this system is accessed from multiple PCs at one time. Normally, the system can be used comfortably from up to three PCs accessing at the same time.
- The image quality, time interval and electronic zoom settings displayed in the [ROOM1] preview window may be different from the actual settings used in the screen when more than one PC is accessing the system at the time. Settings of the preview screen of the last PC that operated [ROOM1] will take effect.

Note: The screen and display examples presented in this document are different depending on the PC OS and web browser being used.

Using the Web browser

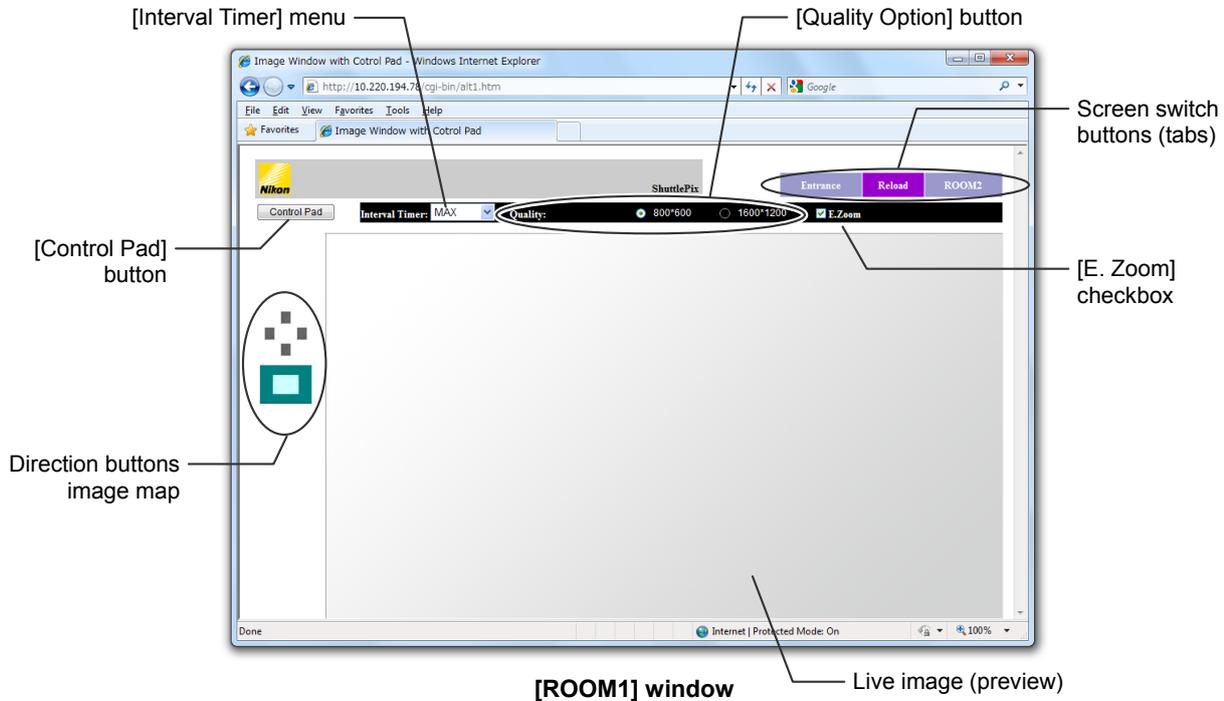
- You may experience behavioral difference and functional limitation depending on your PC environment and version of the web browser.
- This system presents three web screens: [Entrance], [ROOM1] and [ROOM2]. Do not use the [Back] button to switch the web screen. Click the top right tab on the screen instead. If the [Back] button is used to switch the screen, the screen may not be updated. Refresh the screen using [Refresh] in the [VIEW MENU] in this case. Click the [Reload] tab to update the content of the screen to the latest state.
- A sub window may not be displayed if the popup block feature of the web browser is enabled. Disable the block feature to display the sub window.
- Occasionally, the switched page may not be displayed properly. Refresh the page using [Refresh] in this case.
- When the web browser is closed, the ending message such as the one on the right may appear. Click [OK] to close the window.



(2) Operating [ROOM1]

In the [ROOM1] window, preview of the live image of this system is displayed. Images can be captured as required.

When the [ROOM1] window is opened, a live image preview of this system is displayed in specified size. The preview image can be automatically updated by specifying interval.



❗ In case live image is not displayed

- Use of Java applets must be enabled in order to use the [ROOM1] window. See “11.3.1 Enabling Java applets.”
- If the live image preview is not displayed in [ROOM1], check if the personal firewall of your virus protection software is blocking communication with the system.

• Screen switch buttons (Tabs)

- **[Entrance] button:** Return to the [Entrance] window.
- **[Reload] button:** Update the [ROOM1] window.
- **[ROOM2] button:** Display the [ROOM2] window.

• [Control Pad] button

Display the [Control Pad] sub window.

The latest live image can be saved as a file in TIFF or JPEG format from this screen.

Click the top right [X] button to close the sub window. If another window (Entrance or ROOM2) is opened, the sub window is automatically closed.



**[Control Pad]
Sub window**

- **[Interval Timer] menu**

Sets time interval with which the live image is updated. The preview screen is automatically refreshed in the specified interval.

- **[Off]:** Does not update the live image automatically. Click [Reload] to update the image.
- **Seconds:** Updates the live image automatically every specified seconds.
- **[Max]:** Updates the preview image with the maximum possible interval. The update frequency varies depending on the state of the system and network speed.

- **✔ Update frequency of preview screen**

- The setting in the [Interval Timer] menu is just a hint. The actual update interval is determined by the system status and network speed.
- If the [ROOM1] window is being viewed in multiple PCs at the same time, the last settings made are reflected to every web browser. The same preview image is displayed in the same time interval on every PC.

- **[Quality] option button**

Specify the size of the preview image. If you make the size larger, the display speed of the preview image becomes slower. Select an appropriate size for your purpose.

- **[800*600]:** Intermediate quality (0.5M)
- **[1600*1200]:** High quality (2M)

A certain size cannot be used depending on the settings in the system. Unavailable image quality cannot be clicked.

- **[E. Zoom] checkbox, direction buttons and image map**

The [E. Zoom] checkbox allows you to enable or disable electronic zoom. Checking the box displays the direction buttons and image map. The preview screen is enlarged four times. Even though the selected quality of the preview screen was high, an intermediate quality image is used.

The image map is a white rectangle. The gray area in the rectangle indicates the portion being enlarged. The enlarged portion can be moved by directly clicking on the desired location on the image map or by indirectly using four direction buttons up, down, left or right.

Clearing the [E. Zoom] checkbox ends electronic zooming. The direction buttons and image map disappear. The normal preview screen is back.

- **Preview image**

This screen allows you to check the live image of this system prior to bringing it into a PC. Changing the window size will also change the size of the image accordingly.

Note: The screen is temporarily cluttered if the camera mode is changed in the menu while the preview image is displayed. Wait some time until the image is properly displayed in the new mode.

Operating Control Pad screen

Operate the Control Pad screen to capture the image at that time.

■ Saving live image in TIFF format ([Download TIFF])

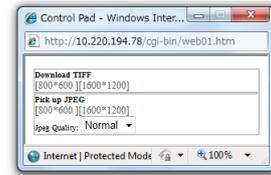
Save a live image in TIFF format.

- 1 Click the image size ([800*600] or [1600*1200]) in [Download TIFF] and select [Save to Disk].

The OS standard dialog box for saving a file appears.

- 2 Select a folder for saving the image file and change the file name if necessary.
- 3 Click the [Save] button to save the image file.

The image captured at the time you pressed the button is saved.



[Control Pad] sub window

■ Saving live image in JPEG format ([Pick up JPEG])

Obtain a live image in JPEG format.

- 1 Select image quality from the [Jpeg Quality] menu in the [Pickup JPEG] section.

Select one from the three levels: [Fine] (high quality), [Normal] (average quality) and [Basic] (low quality). The file size becomes larger as quality becomes higher.

- 2 Click the image size ([800*600] or [1600*1200]) and select [Save to Disk].

The OS standard dialog box for saving a file appears.

Right-clicking the image being displayed and selecting [Save Picture As] also displays the same dialog box.

- 3 Select a folder for saving the image file and change the file name if necessary.
- 4 Click the [Save] button to save the image file.

The image captured at the time you pressed the button is saved.

✔ Images to be saved

The latest image at the time you direct saving of a file will be saved. The saved image and the one that has been previewed may be different.

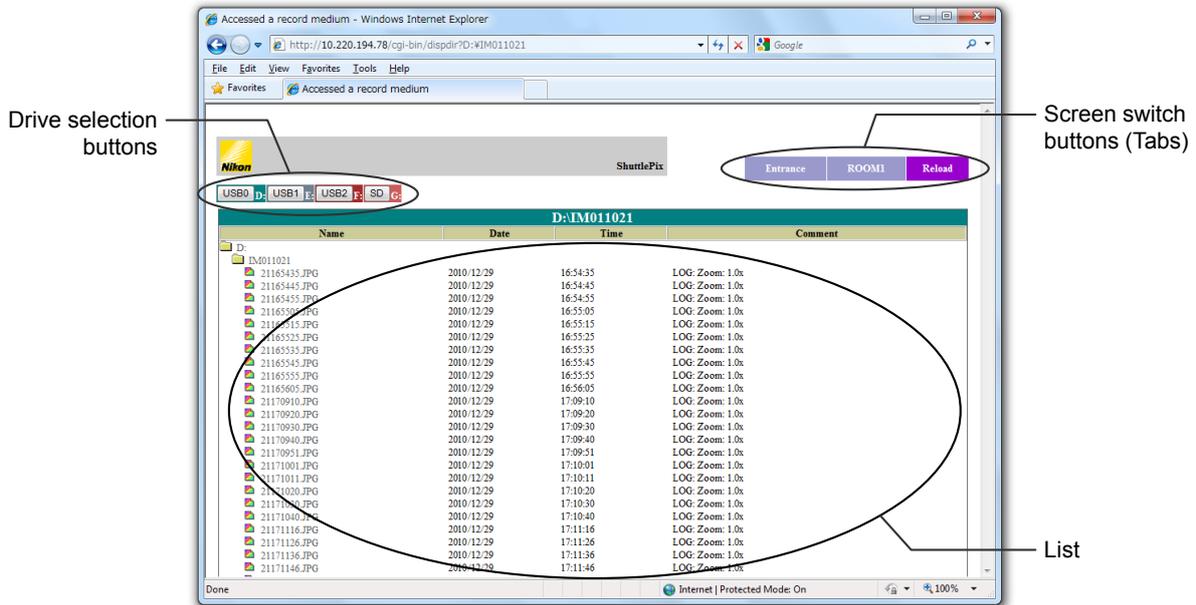
⚠ Cautions

- If [Cancel] is clicked in the file saving dialog box, the preview image may cease to update. In this case, wait some time until it resumes updating or restart web browser.
- The window may be closed while the image file is being downloaded.
- If an image file is directly opened on this system from a PC on a network, the original window may be closed. If this happens, download the file first and then open it.

(3) Operating [ROOM2]

In the [ROOM2] window, download an already captured image file into your PC.

When the [ROOM2] window is opened, a list of recording medium content is displayed. Folders and image files in the recording medium have links. Clicking the links opens the folders and downloads image files.



[ROOM2] window

- **Screen switch buttons (tabs)**

- **[Entrance] button:** Return to the [Entrance] window.
- **[ROOM1] button:** Display the [ROOM1] window.
- **[Reload] button:** Update the [ROOM2] window.

- **Drive selection buttons**

Select a drive to show the list.

- **[USB0/D:] to [USB2/F:] buttons:** Show the list of data in the recording media connected to each USB connector.
- **[SD/G:] button:** Show the list of data in the SD card inserted in the P-400Rv/P-400R.

- **List**

Files saved in the folders up to the second layer from the top in the recording media are displayed. The path of a folder currently displayed is shown at the top of the list.

- Clicking the icon or name of a folder shows folders and image files saved in the folder.
- Icons, file names, creation date and log comments are shown with image files. The image files in JPEG or TIFF format are shown.

✔ File list display

It may take time to display the list if many files are saved in one folder.

Downloading an Image File

- 1 Click the icon or file name of a desired image file in the listing of the [ROOM2] window.

The image opens.

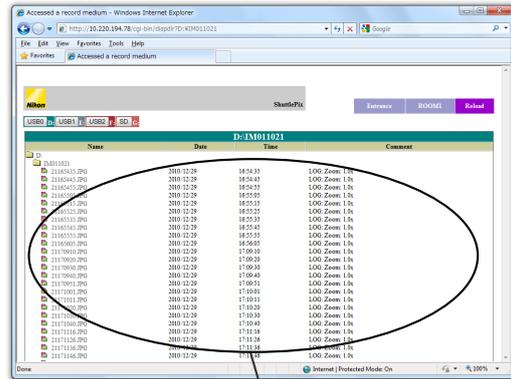
- 2 Right-click the image and save the file by selecting [Save As].

The OS standard file saving dialog box is displayed.

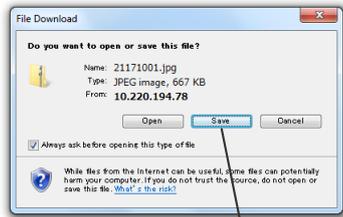
- 3 Select a saving location of the image file and change the file name if necessary.

Even though an image file is clicked on a listing, the image may not be opened. If this happens, download the image file first then open it.

To download an image file and save it into your PC, open the image file and select "Save As" operation, or right-click the image file link and select "Save As" from the menu.



Right-click a desired image and select [Save As].



Select [Save].

Downloading image file

11.4 Transferring Image to FTP Server

Use the FTP client of this system for accessing an FTP server on the network. The following operations are possible with an FTP server.

- **Save a live image directly to an FTP server.**
Save a live image to an FTP server with capturing operations.
- **Upload an already captured and saved image to an FTP server.**
Transfer an image stored on a recording medium to an FTP server.

This system allows you to register up to five target FTP servers and use one by switching between them. Users can transfer images directly to their individual folder by registering different login users.

✔ Network configuration on a PC

In order to use this feature, network configuration (LAN connection) on the PC must be complete. Consult the network administrator of your organization for details on the network configuration.

11.4.1 Configuring FTP Server on a PC

In order to transfer images from this system to a PC, enable an FTP server on the PC. This document describes only basic settings. For detailed settings, see documents such as online help of the OS or FTP server software.

⚠ Caution

In configuring an FTP server on a PC, it is necessary to install an FTP server component and add users to the PC.

In order to accomplish the work, it is necessary to log in to a PC as a user having administrative privilege to the PC. Ask the PC's administrator for help as necessary.

(1) Windows 7

Adding the FTP server component (IIS)

If Internet Information Services (IIS) has not been added as a component, it must be installed.

- 1 Open **[Programs and Features]** in the **[Control Panel]**, and select **[Turn Windows features on or off]**.
- 2 Open **[Internet Information Services]**, select the **[FTP Service]** checkbox under **[FTP Server]** and the **[IIS Management Console]** checkbox under the **[Web Management Tools]**, and then press the **[OK]** button.

Installation starts.

Adding a user

Create a new user account.

- 1 Open **[Administrative Tools]** in the **[Control Panel]** and then open **[Computer Management]**.
- 2 Select **[Computer Management (Local)] - [System Tools] - [Local Users and Groups]**.
- 3 Right click **[Users]** and select **[New User...]**.
- 4 Enter a user name and password.

Use up to eight upper and lower-case alphanumeric characters so that the same information as the external FTP server setting in the ShuttlePix is set. Clear the **[User must change password at next logon]** checkbox.

Creating an FTP site

Create an FTP site and set the basic access right.

- 1 Open **[Administrative Tools]** in the **[Control Panel]** and then open **[Internet Information Services (IIS) Manager]**.
- 2 Open the icon of the PC (PC name) in the left pane of the window, right-click **[Sites]** and select **[Add FTP Site...]**.
The **[Add FTP Site]** dialog box appears.
- 3 Specify **[FTP site name]** and **[Content Directory] - [Physical path]** in the **[Site Information]** window, and click **[Next]**.

Enter an arbitrary site name. Specify the home folder of the transfer destination. When an image file is transferred, the folder specified in the ShuttlePix is created in this folder and the image file is saved in it.

Example:

When "C:\SPFTP" is set for the home folder, and the ShuttlePix is set so that the FTP folder is automatically created, the FTP transfer folder is "C:\SPFTP\FTyymmdd\" ("yymmdd" stands for the year, month and day.)

- 4 Set **[No SSL]** for **[SSL]** in the **[Binding and SSL Settings]** window and click **[Next]**.

Leave other settings at their default settings.

5 Perform the following setting in the [Authentication and Authorization Information] window.

- **[Authentication]**
Set to [Basic]. To enable anonymous login, select the [Anonymous] checkbox.
- **[Authorization] - [Allow access to]**
Select [Specified users] and enter the created user name. To enable anonymous login, set [All users] or [Anonymous users]. (Note that when [Anonymous users] is set, users other than an anonymous user cannot log in.)
- **[Permissions]**
Select both [Read] and [Write] checkboxes.

Note: To log in with an anonymous user, set [Anonymous] for the user ID and [None] for the password in the external FTP server setting in the ShuttlePix.

6 Click the [Finish] button in the [Add FTP Site] dialog box.

The FTP server function starts and information on the created FTP server site is displayed in the [Internet Information Services (IIS) Manager] window.

✔ Access right of the home folder

If it is not possible to access the home folder that has been set, you may need an access right to the home folder. See the information on the OS help, etc. for details on how to set the access right.

Configuring a different folder for each user

By configuring the following setting on the FTP server, the destination folder can be switched in accordance with the logged-in user. Up to five FTP servers can be registered in the ShuttlePix and user information can be switched easily.

1 Open the [Internet Information Services (IIS) Manager] and select the FTP site on the left side pane.

The items that can be executed are displayed in the middle part of the window.

2 Open [FTP Authentication] and enable [Basic Authentication].**3 Open [FTP Authorization Rule] and click [Add Allow Rule...].**

The [Add Allow Authorization Rule] dialog box appears.

4 Select [Specified users], enter the user name, and select the [Read] and [Write] checkboxes in [Permissions].**5 Press the [OK] button to close the [Add Allow Authorization Rule] dialog box.****6 Open [FTP User Isolation], select [User name physical directory] and click [Apply].****7 Create a folder for each user name in the FTP home folder.**

Create a folder with the domain name ([LocalUser] for local users) in the root folder, and then create a folder for the user names in that folder.

8 Set the changeable access rights for the created folders.

Open the folder properties and press the [Edit...] button in the [Security] tab. The access right dialog box appears. Press the [Add...] button in the dialog box to add the corresponding user and select the [Permissions for <user>] - [Modify] checkbox, and then save the setting.

(2) Windows XP Professional

Adding an FTP server component (IIS)

It is necessary to install the Internet Information Service component (IIS) if it has not been installed.

- 1 Open **[Add or Remove Programs]** in the **[Control Panel]** and select **[Add/Remove Windows Components]**.
- 2 Select **[Internet Information Services (IIS)]** and click the **[Details]** button.
- 3 Make sure the **[FTP (File Transfer Protocol) Service]** checkbox is selected. If it has not been selected, select it and click **[OK]**. Follow the instructions to perform installation.

During installation, you are requested to insert the Windows XP CD-ROM. If a pre-installed version is being used, the CD-ROM contents have been normally copied in the System folder of drive C. Specify the appropriate folder for the requested file and continue installation.

Adding a user

Create a new user account.

- 1 Open **[Administrative Tools]** in the **[Control Panel]** and then open **[Computer Management]**.
- 2 Select **[Computer Management (Local)] - [System Tools] - [Local Users and Groups]**.
- 3 Right-click **[Users]** and select **[New User]**.
- 4 Enter a user name and password.

Use up to eight upper and lower-case alphanumeric characters so that the same information as the external FTP server setting in the ShuttlePix is set. Clear the **[User must change password at next login]** checkbox.

Note: An account can be created and a password can be specified also from the **[Control Panel] - [User Accounts]**.

Specifying home folder and setting write permission

Configure so that an image can be written from the ShuttlePix to the FTP server.

- 1 Open **[Administrative Tools]** in the **[Control Panel]** and then open **[Computer Management]**.
- 2 Select **[Computer Management (Local)] - [Services and Applications] - [Internet Information Services] - [FTP Sites]**.
- 3 Right-click **[Default FTP Sites]** and select **[Properties] - [Home Directory]**.
- 4 Specify the target home folder in **[Local Path]** of **[Folder of FTP Site]**. You can leave it as a default setting. Enable write access by selecting the **[Write]** checkbox.

If an image file is transferred, an FTP folder specified in the ShuttlePix is created and the image file is stored in that folder.

Example settings:

When "C:\SPFTP" is set for the home folder, and the ShuttlePix is set so that the FTP folder is automatically created, the FTP transfer folder is "C:\SPFTP\FTTyymmdd\" ("yymmdd" stands for the year, month and day.)

Note: The following information can be set also with **[Administrative Tools] - [Internet Information Services]** in the **[Control Panel]**.

Enabling anonymous login

Normally a specific login user ID and password are used in order to differentiate which user is writing. However, anonymous login is also available.

- 1 Set the user ID to “anonymous” and password to “none” in the external FTP server settings in the ShuttlePix.**
- 2 Configure the FTP server on the PC so that anonymous access is permitted.**

In the [Default FTP Sites] property where you have specified the home folder, select the [Allow Only Anonymous Connections] checkbox on the [Security Accounts] tab.

Note: Note that if [Allow Only Anonymous Connections] is enabled, no one can login except an anonymous user.

Configuring a different folder for each user

By configuring the following setting on the FTP server side, the destination folder can be switched in accordance with the logged-in user. Up to five FTP servers can be registered in the ShuttlePix and user information can be switched easily.

- 1 Open [Administrative Tools] in the [Control Panel] and then open [Computer Management].**
- 2 Select [Computer Management (Local)] - [System Tools] - [Local Users and Groups] - [Users].**
- 3 Double-click a user to be configured and open the properties. Specify the local path in the home folder settings on the [Profile] tab. The local path should be under the home folder.**

Example settings:

When “C:\SPFTP” is set for the home folder, “C:\SPFTP\SP1” is set for the home folder local path for the ShuttlePix, and then the ShuttlePix is set so that the FTP folder is automatically created, the FTP transfer folder is “C:\SPFTP\SP1\FTyymmdd\.” (“yymmdd” stands for the year, month and day.)

- 4 Configure a local path for the second user, third and so on as “C:\SPFTP\SP2”, “C:\SPFTP\SP3” and so on.**

Different folders can be configured for different users.

(3) Mac OS X

This section describes how to set Mac OS X. Log in with a user ID of the system administrator before configuring the following settings.

✔ Mac OS X versions

Mac OS X 10.6 is used in the following procedures. Access from this system to a computer with Mac OS X 10.7 or a later version using an FTP server is not supported.

Adding an FTP server feature

1 Select **[System Preferences]** from the **[Apple]** menu.

2 Click **[Sharing]** from **[Internet & Wireless]**.

3 Select the **[File Sharing]** checkbox.

Shared folders of the logged-in users are listed.

4 Select the **[Share files and folders using FTP]** checkbox.

The setting items may be different in previous versions. See online help of the OS for details.

Adding a user

1 Click **[Account]** in the **[System Preferences]** Window.

2 In the **[Account]** window, click the **[+]** (add) button (or **[New User]**) and set the user ID and password you have set in **[External Server]** in the ShuttlePix.

3 Closes the window.

The IP address of the server can be checked by clicking **[Ethernet Connected]** in **[Network]** in **[System Preferences]**.

Setting the home folder and per-ShuttlePix-user folders

In Mac OS, if a user is added, a home folder that has the same name as the user name will be automatically created under **[Macintosh HD]** - **[Users]**.

If an image file is transferred, an FTP folder specified in the ShuttlePix will be created under the home folder and the image file is stored there.

■ Example settings

When "SP1" is set for the user name and the ShuttlePix is set so that the FTP folder is automatically created, the FTP transfer folder is `"/Users/SP1/FTP/BOX/FTyymmdd/."` ("yymmdd" stands for the year, month and day.)

Each time an account is added, a per-user folder is created. If multiple ShuttlePix users are added, target folders for them are automatically distinguished.

The original access rights of a created folder on Macintosh are read/write by the user and read-only by other users. Do not change the access rights because doing so risks failure of image transfer and deletion of image files by other user.

Configuring and checking network

[Macintosh HD] - **[Applications]** - **[Utilities]** - **[Network Utility.App]** can also be used for configuring and checking the network settings.

- **[Info] tab:** Information such as IP Address is displayed
- **[Ping] tab:** Ping command can be sent

To use the similar feature like Windows Command Prompt, select **[Macintosh HD]** - **[Applications]** - **[Utilities]** - **[Terminal.App]** and display a terminal screen.

11.4.2 Transferring Image to FTP Server

An image can be transferred to an FTP server by either of the following:

Storing an image to an FTP server while being captured

Transferring a stored image to an FTP server

Settings for storing an image on an FTP server while being captured

To store an image on an FTP server while the image is being captured, configure the following settings.

- **Configure a capture-time action.**

Select [SAVE SERVER] in [CAPTURE FUNC] in the [SETUP MENU: ADD] window. See “8.5 Changing Overall Settings” for details.

- **Configure settings about FTP folder and file name.**

Configure automatic generation of folder and file name in the [FTP DIR] and [FILE NAME] areas in [SETUP MENU: FILE] window. See “8.4 Changing Image File Settings” for details.

⚠ Overwriting the file with the same name

When sending an image to an FTP server, whether a file with the same name exists is not checked. In order to avoid overwriting of an image file, include date and time information in the file name.

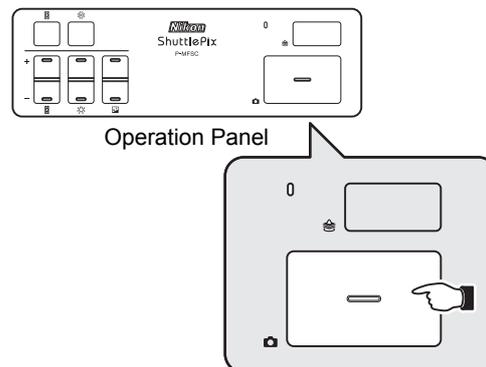
A serial number can be used for file names to avoid this trouble. Note however that the serial number is reset to “0001” when the name of the storage folder or file is changed. A previously saved file may be overwritten and deleted.

(1) Storing an image to an FTP server while being captured

This system allows you to store an image to an FTP server while the system is capturing the image.

A live image can be stored on the FTP server when the image is captured on the motorized stand or touch panel.

In order to store an image on an FTP server when the image is captured, settings must be changed in the setup menu. See “8.5.2 Configuring Capture Function” for details on how to configure the settings.



Saving image on FTP server in capturing

✔ Action taken during image capturing

By setting options in the [Capture Function] area, a live image can be saved on a recording medium or an FTP server while being printed, or directly store it on the FTP server without saving it on the recording medium.

✔ Names of image files

The file naming system and convention for images saved when captured can be changed in the [SETUP MENU: FILE] window. (See “8.4.2 Configuring File Naming System and Convention.”) However, file names assigned when images are captured differ depending on how the images are captured:

• Capturing using the [CAPTURE] button on the motorized stand

Images are saved with the automatically generated file names when captured using the [CAPTURE] button on the operation panel of the motorized stand.

• Capturing using the [CAPTURE] or [CAPT] button in the [EASY MENU] or [MAIN MENU]

When using automatically generated file names, pressing the [CAPTURE] or [CAPT] button saves images on the FTP server. Image files are saved with an automatically generated name.

When image files are set to be named manually in capturing, pressing the [CAPTURE] or [CAPT] button displays the [SAVE AS] window. The automatically generated file name is displayed in the window. Change the file name as required and press the [SAVE] button to save the file.

✔ Interval shooting

- When saving images to an FTP server in interval shooting, the number of capturing times may be decreased if longer time is required for FTP transfer than the shooting interval. Be sure to test this feature before using it.
- Image files are saved with an automatically generated name in interval shooting. File names cannot be specified when capturing.

(2) Transferring a stored image to an FTP server

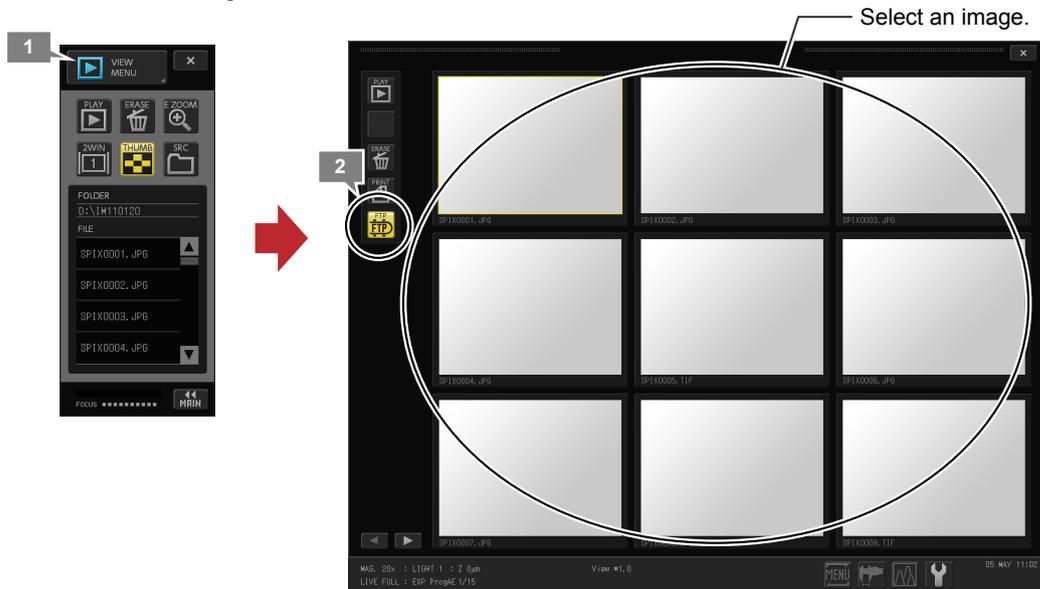
Transfers an image stored on a recording medium to an FTP server.

- 1 Select a desired folder in the [VIEW MENU] and open the [THUMBNAILS] window.

Image files in the selected folder are listed.

- 2 Select a desired image and press the [FTP] button.

The selected image is sent to the FTP server.



Transferring stored image

✔ In case no image is saved on FTP server

Make sure you have configured the network settings of this system correctly and set correct user name and password for logging into the FTP server.

12

Troubleshooting

This chapter describes items to check if the system does not function as you expected, and meaning and handling of the warning messages.

Incorrect use might prevent this system from providing primary performance even though the system is not damaged. If a symptom such as those in the following table occurs, take action as described in the table before requesting repair.

If a problem that is not listed in the table occurs or if a problem that occurred is not resolved by taking action as described in the table, disconnect the power cable of the device, and then contact your nearest Nikon representative.

12.1 Power Supply

Symptom	Possible cause	Action	Ref.
The power does not come on.	The power cord is not connected properly.	Connect the specified power cord correctly.	2.1.1(3) 2.1.2(3)
	The main power switch for the motorized stand is turned off (pressed to the "O" side).	Turn on the main power switch (press it to the "I" side).	3.1.1
The power is turned off.	Auto power save function works.	If no button is pressed during a predetermined period, this system enters the standby status automatically. The system returns from standby mode when the [Capture] button on the operation panel is pressed or a mouse is used in the standby state. If necessary, change the auto power save setting.	3.1.2 8.5.5
The device is hot when touched	The system is used in a hot or confined space.	Use this system in the environment specified in "14 Major Specifications." If the high temperature is accompanied by a burnt smell or other offensive odors, turn off the switch immediately, unplug the power cord, and ask your nearest Nikon representative to repair it.	14.2

12.2 Touch Panel Monitor

Symptom	Possible cause	Action	Ref.
No image appears on the touch panel monitor.	The DVI cable is not connected properly.	Connect the motorized stand and the touch panel monitor properly using the DVI cable and the USB cable supplied with this system.	2.1.2(2)
	The power to the touch panel monitor is off.	Turn on the power to the touch panel monitor.	3.1.1
	Input is not switched correctly.	Switch the input to the digital input (DVI input). If the signal is connected to the video input, disconnect the video cable.	3.2
	The lens cover is attached to the P-400Rv/P-400R.	Remove the lens cover.	-
	The exposure setting is not adequate.	Adjust the exposure so that an image with proper brightness is displayed.	4.3, 4.7 5.3.4
	The P-400Rv/P-400R is not mounted	Mount it correctly	2.1.3
Touch panel cannot be used.	The USB cable is not connected properly.	Connect the motorized stand and the touch panel monitor properly using the DVI cable and the USB cable supplied with this system.	2.1.2(2)
	You are operating the touch panel without using a stylus.	Use a supplied stylus to work with the touch panel. If there is no stylus, touch the panel gently with a fingertip to operate it. Never use a hard or sharp-pointed object to touch the panel screen.	3.2.1

12.3 View of Images

Symptom	Possible cause	Action	Ref.
The image blurs.	The electronic zoom is being used for observation.	Use of the electronic zoom may cause an image to blur depending on the magnification.	4.5 5.2.2 6.2.3
	The image is out of focus.	The focus position of this system is 29 mm off the end of the objective. Move the arm vertically while checking the focus indicator of the touch panel monitor to focus the camera correctly.	3.6 5.2.3
	The system is used in a place subject to frequent vibration.	Use the system in a stable, vibration-free place.	-
	The shutter speed is too slow.	If a slower shutter speed is used for a moving object, the image of the object blurs. Change the exposure mode to the Shutter Preferred mode or the Manual mode and set a faster shutter speed.	4.7.1 5.3.4
	The quality of the image output from the motorized stand is not adjusted properly.	Set an adequate sharpness.	5.4.1(5)
The image is too dark or too bright.	The illumination is not set properly.	When the LED illumination of the P-400Rv/P-400R is used, adjust the illumination area and brightness properly.	3.4 5.2.1
		Adjust the ambient light properly.	-
	The exposure is not adequate.	Perform exposure compensation in the Program AE mode, or set the metering area and metering method properly.	4.7.2 5.3.4(2) 5.4.1
		In the Shutter Preferred mode, set the adequate shutter speed or compensate the exposure. Or set the metering area and metering method properly.	4.7.1 4.7.2 5.3.4(2) 5.3.4(3) 5.4.1
		In the Manual exposure mode, set the shutter speed and the camera gain adequately. Or set the metering area and metering method properly.	4.7.1 5.3.4(3) 5.3.4(4) 5.4.1
	The quality of the image output from the motorized stand is not adjusted properly.	Adjust the saturation, hue, contrast, etc. properly.	5.4.1(5)
	The touch panel monitor is not adjusted properly.	Open the OSD panel of the touch panel monitor, and set the color temperature, contrast, black level, and gamma value properly.	2.2.1
The contrast is low.	The illumination is too bright or too dark.	Adjust brightness of the illumination properly.	3.4 5.2.1
		Adjust the exposure.	4.3, 4.7 5.3
	The quality of the image output from the motorized stand is not adjusted properly.	Adjust the saturation, hue, contrast, etc. properly.	5.4.1(5)
	The touch panel monitor is not adjusted properly.	Open the OSD panel of the touch panel monitor, and set the image quality properly.	2.2.1

Symptom	Possible cause	Action	Ref.
Color reproducibility is not good.	The white balance is not set properly.	Obtain the white balance under the same conditions as for the observation and photography.	4.7.4 5.3.3
	The illumination is too bright or too dark.	Adjust brightness of the illumination properly.	3.4 5.2.1
	The illumination is too bright or too dark.	Adjust the exposure.	4.3, 4.7 5.3
	The quality of the image output from the motorized stand is not adjusted properly.	Adjust the saturation, hue, contrast, etc. properly.	5.4.1(5)
	The color balance of the image output from the motorized stand is not adequate.	Adjust the color balance of the output signal properly.	8.2.2(1)
	The touch panel monitor is not adjusted properly.	Open the OSD panel of the touch panel monitor, and set the image quality properly.	2.2.1
The image quality is rough.	The camera gain is set too high.	Noise due to a high camera gain causes roughness of the image. Adjust the brightness adequately and then adjust the camera gain and the shutter speed.	3.4 4.3, 4.7 5.2.1 5.3
The resolution of the recorded image is low.	The image format is set to JPG BASIC.	Use the TIFF format. When the JPEG format is used, select JPG NORMAL or JPG FINE.	5.4.2(2)

12.4 Image Saving

Symptom	Possible cause	Action	Ref.	
An image cannot be saved onto the recording medium.	The recording medium is not inserted correctly.	Connect the USB memory correctly to the USB connector of the motorized stand or the touch panel monitor. Insert the SD card in the slot of the P-400Rv/P-400R Digital Microscope.	2.4.2 2.4.3	
	The USB memory or the SD card is not initialized.	Initialize it.	2.4.4	
	The SD card is locked.	Release the lock.	2.4.3	
	This system does not support the recording medium in use.	Use the supported recording medium.	2.4.1	
	The amount of the space remaining in the recording medium is insufficient.	Replace it with a medium having sufficient space.		2.4.2 2.4.3
		Delete saved images to increase the amount of available space.		6.3
		Initialize the medium.		2.4.4
The save folder setting is incorrect.	Check that the folder is correctly set as a save folder.	4.2 5.4.2(5)		
The recorded image cannot be read.	The settings of the save folder and the playback folder are incorrect.	Check that the folder is correctly set as a playback folder.	4.2 5.4.2(5)	
	The recording medium is damaged.	Replace the recording medium.	2.4.2 2.4.3	

12.5 Network

Symptom	Possible cause	Action	Ref.
The system cannot access the network.	The network cable is not connected properly.	Connect it correctly.	11.2.3
		Do not connect the motorized stand to the uplink connector of the hub.	11.2.3
	The network cable is not correct.	Check that the category of the network cable is correct for the network.	11.2.3
		Use a straight cable to connect the system via the hub.	11.2.3(1)
		Use a cross cable to connect the system directly to the network connector of the personal computer without using the hub.	11.2.3(2)
	The network settings are not correct.	Correct the settings for the network to be connected.	8.3 11.2.2
	DHCP is set in the environment where no DHCP server is installed.	To assign IP addresses dynamically using DHCP, the DHCP server must be connected to the network.	8.3 11.2.2
	The web browser or FTP setting is not correct.	Correct the setting.	11.3.1 11.4.1
	The proxy setting is not correct.	Correct the setting.	11.3.1(2)
The firewall is set.	Change the setting.	11.3.1(1)	
No image can be saved in the FTP server.	The network settings are not correct.	Correct the settings. Pay special attention to IP address and network validity settings. If data will be exchanged between different network groups, be sure to specify the gateway address.	8.3 11.2.2
	Settings on the FTP server are not correct.	Check that the FTP server operates.	11.4.1
		Check that the access right is set correctly.	11.4.1
	The FTP client function is not enabled.	Set the FTP client function to "Enable" in the [SETUP MENU: NET] window.	8.3.2
	The IP address of the FTP server is not correct.	Set the correct IP address. If the specified IP address is not found on the network, images cannot be sent. If connection will be made between different network groups, be sure to specify the gateway address.	8.3.2
	The login account to the FTP server is not correct.	Enter the correct user ID and password.	8.3.2
The firewall is set.	Change the setting.	11.3.1(1)	
Images are overwritten when saved in the FTP server.	The file name is not created automatically.	Select the [DATE] checkbox in the [SETUP MENU: FILE] window to set the automatic file name based on the date and time setting.	8.4

12.6 Printing

Symptom	Possible cause	Action	Ref.
The image cannot be printed by a PictBridge compatible printer.	The printer is not connected properly.	Connect the printer to the USB (D) connector on the right side of the motorized stand.	9.2
	The power to the printer is not turned on.	Turn on the power to the printer. If the power is on, turn off and then turn on the power to the printer and retry printing.	-
	The USB device mode setting is not correct.	To connect a PictBridge printer, set the USB device mode to [Printer].	9.1
	Consumables such as paper and ink run out.	Refill or replace the consumables by referring to the instruction manual of the printer and retry printing.	-

12.7 System Operation

Symptom	Possible cause	Action	Ref.
Date or time is incorrect.	The system is left for a long time with the power cord disconnected or the main power turned off.	If the power cord is kept disconnected for a long time, the backup function declines causing the internal clock to be reset. Turn on the power and correct the date and time.	2.1.1(3) 3.1.1
The mouse does not work properly or at all.	It is a Nikon non-proven component.	Use a component whose operation has been proven by Nikon.	2.1.4
	Two tiers of USB hubs are used.	Use only a single-tier hub.	2.1.4
The brightness of the illumination cannot be adjusted.	Hi-reflection Sample is selected as the scene mode.	Change the scene mode to another mode.	5.3.1

12.8 Warning Message List

Display	Meaning	Action	Ref.
NO MEDIA	There is no recording medium connected.	Connect a recording medium.	2.4
OUT OF MEDIA SPACE	The recording medium does not have enough memory space for image storage.	Replace the recording medium or delete unnecessary files from the medium and try capturing again.	2.4 6.3
MEDIA LOCKED	The recording medium is locked to prevent data from being deleted by mistake.	Release the lock.	2.4
MEDIA HAS A PROBLEM	The image cannot be saved onto the recording medium	Check the destination setting of the image and select the medium having enough memory space.	2.4 4.2 5.4.2(5)
MEDIA ERROR	Writing to the recording medium or loading from the recording medium failed.	Replace the recording medium.	2.4
FILE ALREADY EXISTS	When an attempt to save an image was made, a file with the same name was found in the recording medium.	Set the file name to be automatically created or change the destination folder name and save the image.	8.4.2 4.2 5.4.2(5)
FILE HAS A PROBLEM	The specified file was not played back due to an error.	Specify a file supported by the system.	-
FILE PROTECTED	The file to be deleted is read-only, or the folder to be deleted contains a read-only file.	Remove the read-only attribute from the file using a PC.	-
DESTINATION NOT SPECIFIED	The behavior when an image is captured is not set.	Correctly assign the behavior when an image is captured.	8.5.2
FTP HAS A PROBLEM	The image cannot be stored in the FTP server.	Check the network setting. Before recording the image, confirm the correct connection is being used by running the PING and login tests.	8.3 11.4
NO PRINTER	No printer is connected.	Connect a printer.	9.2
	The printer is powered off.	Turn on the printer.	-
PRINTING FAILED	Printing cannot be completed due to an error.	Check if ink or paper in the printer has run out.	-
NO CAMERA	The P-400Rv/P-400R is not connected correctly.	Turn off the system, assemble the P-400Rv/P-400R, and then turn it on again.	2.1.3
	An AC adapter is connected to the P-400Rv/P-400R.	Unplug the AD adapter and turn on the power again.	
SYSTEM ERROR	A serious internal error has occurred.	Turn off the system and then back on. If this error frequently occurs, contact your nearest Nikon representative.	-
REBOOT REQUIRED	The settings that require rebooting, such as network settings, have been changed.	Turn off the power and then back on.	3.1
WHITE BALANCE FAILED	White balance was not obtained correctly.	Prepare an object of homogeneous color and try again.	4.7.4 5.3.3
ILLUMINATION LEVEL CAN'T BE ADJUSTED IN HI-REFLECTION SAMPLE MODE.	The light control button is used when Hi-reflection Sample is selected as the scene mode.	The brightness of the LED illumination is set to 10 in the Hi-reflection sample mode and is not changeable. To adjust the brightness, select another scene mode.	5.3.1
CUSTOM SETTING DATA CORRUPTED (CSTM1 to CSTM4, OFF)	The registered custom settings (CSTM1 to 4) or the settings saved at power-off (OFF) may be corrupted.	To use the custom settings, set the capture conditions and register the custom settings again. If the settings saved at power-off are corrupted, set the system settings again.	5.4.1(6)

13

Daily Maintenance

This chapter describes how to maintain the system.

To prolong the performance of this system, Nikon recommends you to perform daily maintenance.

13.1 Utensils and Consumables

- **Cleaning utensils**
Soft-tip brush (or a clean-room wiper in the clean room environment)
- **Consumables**
Ethyl or methyl alcohol
Lens tissue (or a clean-room wiper in the clean room environment)

13.2 Cleaning the Lens

Do not let stains, such as dust or fingerprint, get on the surface of the lens. Such stains degrade the view of images. If the lens becomes dirty, clean it as described below.

- Brush away the dust with a soft-tip brush or gently wipe it away with a piece of gauze.
- Only if the lens becomes dirty with fingerprints or grease stains, slightly dampen a piece of soft, clean cotton cloth, lens tissue, or gauze with absolute alcohol (ethyl or methyl alcohol) and gently wipe away the stains.
 - Since absolute alcohol is highly flammable, be careful in handling it so that it does not ignite.
 - Observe the manufacturer's handling instructions when handling absolute alcohol.

13.3 Cleaning the LCD Panel

- Use a piece of soft, clean cotton cloth, lens tissue, or gauze and gently wipe away stains on the LCD panel of the touch panel monitor.
- Only if the lens becomes dirty with fingerprints or grease stains, slightly dampen a piece of soft, clean cotton cloth, lens tissue, or gauze with absolute alcohol (ethyl or methyl alcohol) and gently wipe away the stains.
 - Since absolute alcohol is highly flammable, be careful in handling it so that it does not ignite.
 - Observe the manufacturer's handling instructions when handling absolute alcohol.

13.4 Cleaning Painted, Printed, or Plastic Parts

- If these parts become excessively dirty, wipe them gently with a piece of gauze slightly soaked with diluted neutral detergent.
- Do not apply any organic solvent (such as alcohol, ether, or paint thinner) to painted parts, plastic parts, and printed parts. These substances may cause discoloration or peeling of the printed matters.

13.5 Storage

- Store this system in a location with low humidity where mold is unlikely to form.
- During storage, place a plastic cover over the equipment to prevent dust accumulation.
- Before placing the plastic cover, turn off the power switch for the touch panel monitor (press it to the "O" side) and wait for the touch panel monitor to cool down.

13.6 Periodic Inspections (Charged)

Periodic inspections are recommended in order to maintain the performance of this system. Consult your Nikon representative for details about periodic inspections.

14

Major Specifications

Major specifications of the system are listed in this chapter.

14.1 P-400Rv/P-400R Digital Microscope

For the specifications for the following products, see the instruction manual for each product.

- P-400Rv/P-400R Digital Microscope, AC Adapter, P-RC Remote Controller (P-400Rv only), P-RELS Release
- P-Li01 P-Li-ion Rechargeable Battery
- P-CH01 P-BACH Battery Charger

14.2 P-MFSC Motorized Focusing Stand Controller

Model name	P-MFSC Motorized Focusing Stand Controller
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Focusing module

P-400Rv/P-400R mount	Square dovetail mount (secured with a clamp lever)
Vertical stroke	Up 148 mm, down 2 mm (with reference to the upper plate of the stage) with vertical limits
Speed at coarse focusing	0.8 to 10 mm/sec.
Speed at fine focusing	0.08 to 5 mm/sec.

Stage mount

Stage mount	Round dovetail mount (standard dimension: 93 mm diameter)
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Image recording

Capturing mode	Single/interval shooting
Recording medium	SD card on the P-400Rv/P-400R (compliant with SD2.0 standard (SDHC): card capacity: up to 16 GB) USB memory (FAT16/FAT32)
File format	TIFF: 8-bit, non-compressed JPG FINE: compression ratio = about 1/4 JPG NORMAL: compression ratio = about 1/8 JPG BASIC: compression ratio = about 1/16 HDR original EDF original
Exif information	Complies with Exif 2.2

Camera control

Communication	USB2.0 PTP (Picture Transfer Protocol)
Image data transfer	LVDS, 3 pairs
Scene mode	6 modes (standard, silicon wafer (IC chip), metal ceramic, circuit board, FPD, Hi-reflection)
Custom setting	4 settings
Aperture	Resolution preferred/DOF preferred
Exposure mode	Program AE/shutter preferred/manual
Metering method	Average metering/peak-hold metering with AE lock functionality
Metering area	Large/medium/small (the metering area can be specified)
Exposure compensation	-2EV to +2EV in 1/3EV steps
Shutter speed	In program AE mode: 1/1000 sec. to 1 sec. In manual/shutter preferred mode: 1/1000 sec., 1/700 sec., 1/500 sec., 1/350 sec., 1/250 sec., 1/180 sec., 1/125 sec., 1/90 sec., 1/60 sec., 1/40 sec., 1/30 sec., 1/20 sec., 1/15 sec., 1/10 sec., 1/8 sec., 1/6 sec., 1/4 sec., 1/3 sec., 1/2 sec., 1/1.5 sec., 1 sec. (21 steps)

Shutter speed (in Hi-reflection sample mode)	In program AE mode: 1/20000 sec. to 1 sec. In manual/shutter preferred mode: 1/20000 sec., 1/16000 sec., 1/11000 sec., 1/8000 sec., 1/5700 sec., 1/4000 sec., 1/2800 sec., 1/2000 sec., 1/1400 sec., 1/1000 sec., 1/700 sec., 1/500 sec., 1/350 sec., 1/250 sec., 1/180 sec., 1/125 sec., 1/90 sec., 1/60 sec., 1/40 sec., 1/30 sec., 1/20 sec., 1/15 sec., 1/10 sec., 1/8 sec., 1/6 sec., 1/4 sec., 1/3 sec., 1/2 sec., 1/1.5 sec., 1 sec. (30 steps)
Camera gain (ISO sensitivity)	In program AE or shutter preferred AE mode: 100 to 2250 Manual mode: 100, 140, 200, 280, 400, 560, 800, 1130, 1600, 2250 (10 steps)

Image processing

Focus assist functionality	Meter indication with a focus indicator
Brightness histogram display	Possible
Shading correction	Factory setting
White balance	Set method, red/blue gain adjustment
Gamma (tone) correction	7 settings
Real-time pixel complementary processing	RGB from bayer arrangement
Contour processing	9-step switching (-3 (soft) to +5 (sharp))
Hue adjustment	-50 to +50 (in 1 steps)
Saturation adjustment	-50 to +50 (in 1 steps)
Special effects	Color/negative-positive/monochrome
EDF (Extended Depth of Focus) image	Still image display Display image: 800 x 600 Recorded image: 800 x 600 Z step width: Settable (the default is calculated from the zoom magnification) Z scan direction: From bottom to top Height data for 3D display: Can be calculated.
Halation elimination	Live display (frame rate: up to 5 fps) Live image: 800 x 600 / 1280 x 960 Recorded image: 800 x 600 / 1600 x 1200
HDR (High Dynamic Range) image	Still image display Display image: 800 x 600 / 1280 x 960 Recorded image: 800 x 600 / 1600 x 1200

Image editing

Distance measuring functionality	Distance between two points, perpendicular distance, distance between the center points of two circles, angles, circles, area, and pitch
Calibration	In zoom magnification / using the registered user-configured value
Annotation	Count marking, text input, pen drawing (line, curve), scale display, crosshairs, grid, XY scale, XY measurement,
Scale/measurement information	Added to the image, saved as a CSV file, saved as a tool file (can be used by a PC application)

Display processing

Live display	1600 x 1200 : 15 fps 800 x 600 : 28 fps
Enlarged display	Electronic zoom: 1x to 16x (the enlarged area can be specified)
Thumbnail display	9 frames
2-window display	Live image/still image (the display area can be specified)
Operation menu display	EASY/MAIN/VIEW/TOOL/TOOLBAR/SETUP
Language setting	Japanese/English
Date and time setting	Year/month/day/hour/minute

Operating sound	Off/1 to 6
Auto power save	Off/1 to 60 minutes

Printer output

Compatible printer	PictBridge compatible printer
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Network function

Standard	IEEE 802.3 compliant, 10Base-T/100Base-TX, DHCP supported
HTTP server	Browser display, image transfer
FTP server	Image transfer

I/O connector

P-400Rv/P-400R connection terminal (arm)	For connecting the P-400Rv/P-400R
USB (D) connector (side)	For connecting a PC/printer (USB 2.0 compatible)
USB (H) connector (side)	For connecting USB devices, such as USB memory, mouse and keyboard
USB (H) connector (back)	For connecting the P-TPM Touch Panel Monitor
DVI-I connector	For connecting the P-TPM Touch Panel Monitor
AC inlet	For connecting the power cord
10/100Base-T connector	For connecting to a network

Power supply

Rated input voltage	100 to 240 VAC $\pm 10\%$, 50/60 Hz $\pm 5\%$
Power consumption	140 VA
Power cord	For regions where the power supply is 100 to 120 VAC: Use a UL-listed detachable three-conductor power cord set. (3 conductor grounding Type SVT, NO.18 AWG, 3m long maximum, rated at 125 VAC minimum) For regions where the power supply is 220 to 240 VAC: Use an EU/EN-approved three-conductor power cord set. (3 conductor grounding Type H05VV-F, 3m long maximum, rated at 250 VAC minimum) For use in Japan: Use a PSE certified detachable three-conductor power cord set. (3 conductor grounding Type VCTF 3x0.75mm ² , 3m long maximum, rated at 125 VAC minimum.)

Other specifications

Accessory tool	Hex driver (width across flats: 2 mm)
External dimensions (width x height x depth)	280 x 450 x 404 mm
Mass	Approximately 11 kg
Usage environment	Temperature: 0 to +40°C Humidity: 60% RH Max. (no condensation) Altitude: 2,000 m Max. Pollution degree: Degree 2 Overvoltage category: Category II Electric shock protection class: Class I, indoor use only
Storage environment	Temperature: -20 to +60°C Humidity: 90% RH Max. (no condensation)

14.3 P-TPM Touch Panel Monitor

For the specifications for the following product, see the instruction manual for the product.

- P-TPM Touch Panel Monitor

14.4 Applied Standards

<p>Safety standards</p> <p>Certificates are granted for the combination of the following products:</p> <ul style="list-style-type: none"> • P-400Rv/P-400R Digital Microscope • P-MFSC Motorized Focusing Stand Controller • P-TPM Touch Panel Monitor 	<p>FCC Part 15 Subpart B Class A</p> <p>Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.</p> <p>CAN ICES-003(A) / NMB-003(A) Australian EMI (AS/NZS CISPR11) CE marking</p> <ul style="list-style-type: none"> • Low Voltage Directive • EMC Directive 
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14.5 Supported Standards

- **Exif (Exchangeable image file format) Version 2.2:**
 This standard is intended to enhance the coordination between a digital camera and printer to easily obtain high-quality print output. When using a printer complying with this standard, optimal print output is provided by using capture information. See the instruction manual for the printer for details.
- **PictBridge:**
 PictBridge is a standard in which digital camera manufacturers and printer manufacturers guarantee interconnection between a digital camera and a printer so that an image on a digital camera is output directly from a printer without using a PC as an interface.