

M559 E 13.1.NF.4



M559EN04

Nikon

ShuttlePix

P-400R Digital Microscope

Instructions

Preface

Thank you for purchasing the Nikon products.

This instruction manual has been prepared for users of the Nikon P-400R Digital Microscope.

To ensure correct use, please read this manual carefully before use. Always keep this manual at hand for future reference.

- No part of this manual may be reproduced or transmitted in any form without prior written permission from Nikon.
- The content of this manual is subject to change without notice.
- The appearance of the actual product may differ from the illustrations in this manual.
- Although every effort has been made to ensure the accuracy of this manual, errors or inconsistencies may remain. If you notice any points that are unclear or incorrect, please contact your nearest Nikon representative.
- Some of the devices described in this manual may not be included in the set you have purchased.
- If you intend to use any other products with this product, read the manual for that product too.
- If you want to attach the P-400R Digital Microscope to a P-MFSC Motorized Focusing Stand Controller for use with a P-TPM Touch Panel Monitor, see the "ShuttlePix Digital Microscope Instructions."
- If this product is used in a manner not specified by the manufacturer, the protection provided by this product may be impaired.

Symbols used in this manual

This manual uses the following symbols for special purposes.



This icon marks precautions, the 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.

Trademarks in this manual

- Microsoft and Windows are trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.
- SD and SDHC Logos are trademarks of SD-3C, LLC.
- All other company names and product names are trademarks or registered trademarks of their respective holders.

Features of This Product

The Nikon P-400R is a digital microscope provided with a 20x optical zoom lens.

This product has a built-in CCD camera, and allows you to observe the image with a monitor on the side of the product and the image can be played on the LCD monitor of this system as well as an external monitor. The image being observed can be recorded as a high-definition digital photo.

In addition to handheld use, the P-400R can be used with the optional P-MFSC Motorized Focusing Stand Controller and the P-TPM Touch Panel Monitor.

- **All-in-one digital microscope**
The battery-powered digital microscope equipped with an illuminator and a monitor allows you to observe and capture images without cable connections.
- **20x optical zoom**
A 20x high magnification zoom lens is installed, which enables not only capturing an image of an entire sample at low magnification but also capturing a more detailed image at high magnification.
- **Internal LED illumination unit**
A LED ring illuminator is installed inside the main unit. Oblique illumination is also available by switching the illumination pattern.
- **Built-in LCD monitor**
The 2.7-inch built-in LCD monitor enables live observation of a microscopic image, playback of captured images, and specification of various settings from software menus.
- **High-quality image capturing**
The same image processing engine as used in the Nikon Compact Digital Camera series is installed.
- **Vibration reduction**
Slow shutter-speed limitation and the best-shot selector function prevent blurred images from being saved.
- **Multiple measurement scale display**
Various types of measurement scales such as a reduction scale, cross scale, H-shaped scale and grid scale can be displayed. The scale values change in accordance with the zoom magnification.
- **Quick view on a PC**
When the P-400R is connected to a PC using a dedicated P-CUS USB cable, a high-definition image display on a PC by capture operation is available.

❗ Notes on the LCD monitor

The display color slightly varies depending on the individual differences of the LCD monitor. Therefore the color of the image displayed on the P-400R LCD monitor may differ from the color of the image file actually stored. Note that the image may not appear white on the LCD monitor even if white balance is set using a white object.

Contents

Preface.....	i
Features of This Product.....	ii
Contents	iii
Safety Precautions (Be sure to read the following before use)	vi
1 Names of Components	1
2 Preparing for Use	6
2.1 Preparing a Battery.....	6
2.1.1 Charging a battery	6
2.1.2 Inserting a battery	8
2.1.3 Precautions for the battery and battery charger	10
2.2 Preparing the Recording Medium.....	11
2.2.1 Preparing the SD card	12
(1) Inserting the SD card	12
(2) Formatting the SD card	13
2.2.2 Specifying an Active Folder	14
2.3 Connecting an External Monitor (optional)	15
2.4 Connecting the AC Adapter (optional)	16
2.5 Setting the Display Language and the Date and Time (At Initial Power-On) ..	17
3 Basic Operations.....	18
(1) Turning on the power.....	18
(2) Directing the P-400R to the object.....	18
(3) Obtaining optimal shooting conditions	19
(4) Capturing an image	19
(5) Playing back the captured image	20
(6) Deleting captured image.....	21
4 Basic Operations for Capturing and Playing Back	22
4.1 Turning On and Off the Power.....	22
4.2 Operating the LCD Monitor.....	24
4.2.1 Opening the LCD panel	24
4.2.2 Operating the LCD panel	24
4.3 Observing	25
4.3.1 Starting shooting mode	25
4.3.2 Directing the P-400R to the object	26
(1) Holding the microscope in hand	26
(2) Using the microscope with a tripod	26
(3) Using the microscope with the contact observation adapter	27
4.3.3 Operating the illumination.....	28
(1) Switching the illumination area	28
(2) Adjusting brightness of the illumination	29
4.3.4 Using zoom.....	30
4.3.5 Checking the focus.....	31
4.3.6 Selecting a scene mode suitable to the specimen	32
4.3.7 Using custom settings	34

4.3.8	Changing the aperture mode	35
4.3.9	Adjusting the exposure	36
(1)	Compensating the exposure	36
(2)	Setting the shutter speed	37
(3)	Setting the camera gain	38
(4)	Using the AE lock	39
4.3.10	Setting the white balance	40
4.4	Capturing the Image under Observation	41
4.4.1	Capturing an image	41
4.5	Playing Back Captured Images	43
4.5.1	Starting playback mode	43
4.5.2	Switching the image	44
4.5.3	Displaying thumbnail images	44
4.5.4	Enlarging an image	45
4.6	Deleting Captured Images	46
4.6.1	Deleting the image that has just been captured	46
4.6.2	Deleting the currently displayed image	47
4.6.3	Deleting the currently displayed image	48
5	Advanced Use of Capturing Functions	49
5.1	Setting the Measurement Scale	51
5.2	Setting the Active Folder	53
5.2.1	Creating a new folder	53
5.2.2	Setting an existing folder as the active folder	54
5.3	Selecting the Image Quality Mode	55
5.4	Selecting the Image Size	56
5.5	Selecting the Exposure Mode	57
5.6	Program AE Settings	58
5.7	Setting the Quality of Images to be Captured	60
5.8	Switching the Metering Method	63
5.9	Switching the Metering Area	64
5.10	Using Continuous Shooting Mode	65
5.11	Correcting Shading	67
5.12	Registering a Custom Definition	68
6	Advanced Use of Playback Functions	69
6.1	Deleting Multiple Images All at One Time	71
6.1.1	Deleting the selected images	71
6.1.2	Deleting a folder containing images	72
6.2	Specifying the Playback Folder	74
7	Changing Settings	75
7.1	Adjusting the Brightness of the LCD Monitor	77
7.2	Adjusting the Volume of the Operation Sound	77
7.3	Selecting the Video Output Signal Format	78
7.4	Initializing an SD Card	78
7.5	Setting the Automatic Power Save Function	79
7.6	Selecting the Language	79
7.7	Setting the Current Date and Time	80

7.8	Setting the Vibration Alarm Display	81
7.9	Checking the Version Information.....	81
7.10	Restoring the Initial Settings.....	82
8	Connecting to a PC	83
8.1	ShuttlePix Editor	84
8.2	Quick View.....	84
9	Troubleshooting.....	85
9.1	Power Supply and Battery	85
9.2	Image Display.....	86
9.3	Working with This Product.....	87
9.4	View of Microscopic Images	87
9.5	Image Saving.....	89
9.6	System Operation	89
9.7	Warning Messages	90
10	Daily Maintenance.....	94
10.1	Utensils and Consumables.....	94
10.2	Cleaning the Lenses.....	94
10.3	Cleaning the LCD Panel.....	94
10.4	Cleaning Painted, Printed, or Plastic Parts.....	95
10.5	Storage	95
10.6	Periodic Inspections (Charged)	95
11	Major Specifications	96
11.1	P-400R Digital Microscope	96
11.2	AC Adapter	100
11.3	P-RELS Release	100
11.4	Supported Standards.....	101




Safety Precautions (Be sure to read the following before use)

For safe and proper use of this product, carefully read the following precautions.

WARNING and CAUTION symbols used in this manual

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 the product. Do not discard this manual and keep it at hand for future reference.

Safety instructions in this manual are marked with the following symbols to make them stand out. For your safety, always follow the instructions marked with these symbols.

Symbol	Meaning
 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 capturing, and for displaying the captured images. Do not attempt to use it for any other purpose.

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.

**WARNING (for the overall product)**

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 AC adapter cord, and ask your nearest Nikon representatives for repair.

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 AC adapter 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 place anything on the product or cover the product.**

Do not place anything on the product or cover the product. Doing so might result in damage to the product or a fire. This is because heat emission is hindered and abnormal heat might be caused.

9. **Use the specified AC adapter.**

An optional AC adapter can be used as a power supply for the P-400R. 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.

- For details on the specified AC adapter, see "11 Major Specifications."
- 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-400R without fail to prevent failure or malfunction.

10. **Check the input voltage.**

The P-CH01 P-BACH Battery Charger and the P-400R AC adapter operate on 100 to 240 VAC, 50 to 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 this product or fire.

**WARNING (for the overall product)****11. To connect to a PC, feed power from as near AC outlets as possible.**

If you connect this product to a PC, connect each device to as near AC outlets as possible. If the units are plugged in AC outlets apart from each other, difference in voltages may cause a potential difference, resulting in malfunction.

12. Use the specified power cords.

Make sure that the power cord connected to the P-400R AC adapter is the power cord specific to the P-400R Digital Microscope. If any other power cords are used, it may cause malfunction or overheating of the equipment or fire.

- For details on the specified power cords, see “11 Major Specifications.”
- To protect from electric shock, always turn off the power switch before disconnecting and connecting power cords.
- Because the P-400R AC adapter is a product in electrical shock protection class I, always connect the adapter to a grounded AC outlet.

13. Precautions for illumination

A ring illuminator that uses white LEDs is installed around the lens of the 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 you observe a specimen with a high reflection rate, illumination may be scattered around the specimen. Wear protective glasses or goggles if necessary.

14. 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 “10 Daily Maintenance.”

3. Precautions against electromagnetic interference

This product generates weak electromagnetic waves. Do not put any precision electronic devices close to this product. Their accuracy may be decreased. If the receiving status of a TV set or radio set is affected, put them a little far from this product.

4. Turn off the power before plugging in/unplugging cables and starting maintenance work.

To prevent the occurrence of possible accidents such as electrical shock and fire, always turn off the power to the product, remove the battery, and disconnect the power cord before installing the product, plugging in/unplugging of cables, or starting maintenance such as cleaning the lens.

5. Precautions for the LCD panel

- Do not strike or push the LCD panel screen too hard. The surface glass of the LCD panel may be broken and cause injury.
- Do not expose the LCD panel to direct sunlight or strong ultraviolet radiation. Doing so may cause the display characteristics to degrade.

6. Precautions for use of the strap

When attaching the strap to the P-400R, observe the following precautions.

- The 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-400R with the strap attached, be careful not to let the strap to get caught on something. Otherwise, it may cause unexpected injury or damage to this product.

**CAUTION (for the overall product)****7. Precautions for 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.

- **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**
Select 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.
- Use this product in a less dusty and dirty location.
- 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.
- For details on the usage and storage environments for this product, see “11 Major Specifications.”

8. 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.**
Otherwise, the battery may 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-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.**
Otherwise, the battery may 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.**
Otherwise, the battery may 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, insulates 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 “11 Major Specifications.”
 - Never leave the battery in a location where it will be subject to high temperature, 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 outlet and ask your nearest Nikon representatives for repair.
3. **If you notice any abnormality such as overheating, smoke, or burnt odor, immediately pull out the power cord from the 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 outlet. Ask your nearest Nikon representative for repair.
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 to 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 cords are used, it may cause malfunction or overheating of the equipment or fire. Do not connect the power cord supplied with the battery charger to 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. **Pull out the power cord when the battery charger is not used.**
Otherwise, electric shock may occur.

1

Names of Components

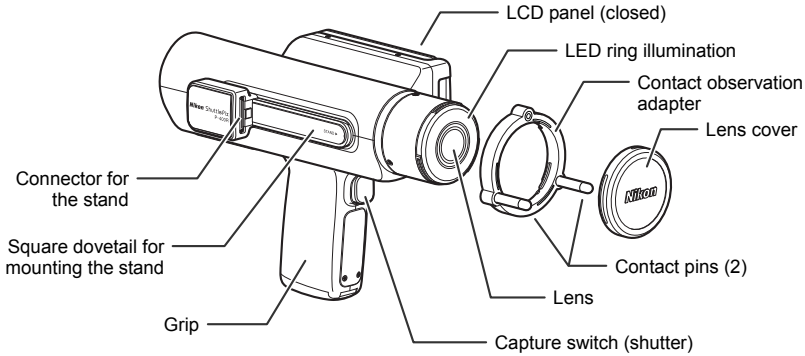
This chapter explains the names of major components of the P-400R Digital Microscope.

Before using the P-400R 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.

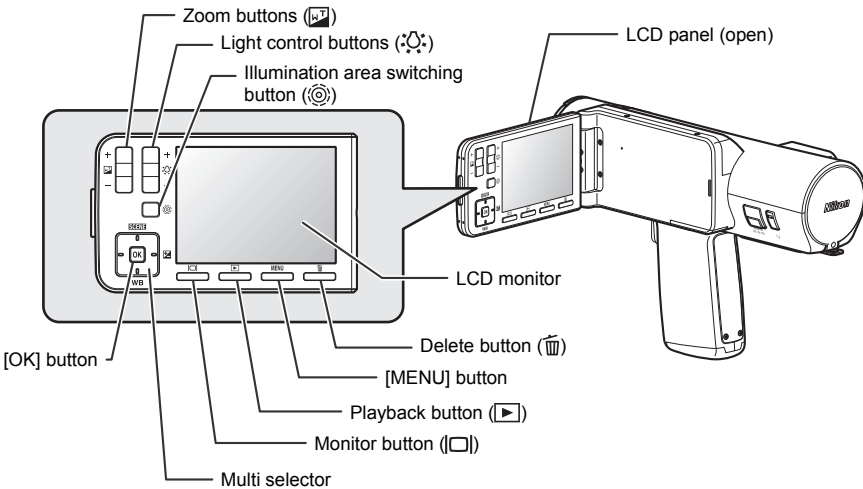
1

Names of Components

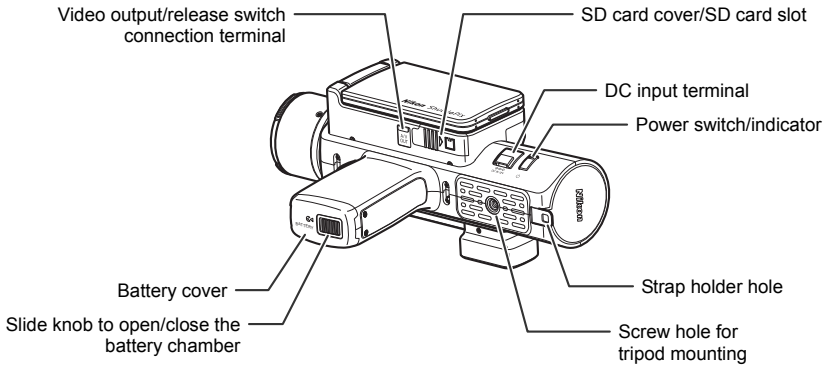
Front/left side view



LCD panel



Right side/bottom/rear view



✓ Recording images

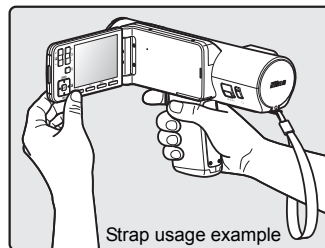
To record images, a commercially available SD card is required. Prepare an SD card by referring to "2.2 Preparing the Recording Medium."

✓ Operation when the product is attached to the stand

For details on the operation when the P-400R is attached to the P-MFSC Motorized Focusing Stand Controller, see the "P-400R Digital Microscope Instructions."

Attaching a strap

A strap can be attached to the back of the P-400R in order not to drop it.



⚠ Caution: Attaching a strap

- The P-400R weighs approximately 1.1 kg including the battery. Make sure that you use a camera strap or a similar strap that has adequate strength.
- Do not use a thin strap like the one for a mobile phone. Such a strap might be broken, resulting in damage to the product.

Information displayed on the monitor

Shooting mode

Items displayed during capturing are listed below.

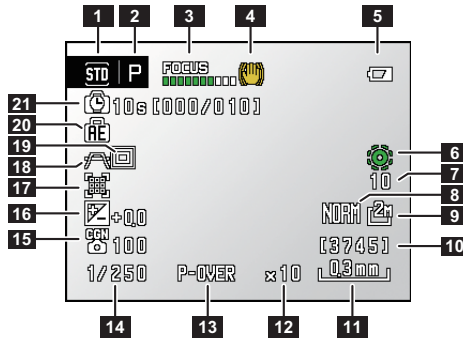


Table: Display in the shooting mode

No.	Item	Content
1	Scene mode	: Standard, : Wafer/IC chip, : Metal Ceramic, : Circuit board, : FPD (Flat Panel Display), : Hi-reflection Sample, : Custom 1 to 4, : Hi-reflection Custom 1 to 4
2	Shooting mode	P : Program AE, S : Shutter-priority AE, M : Manual
3	Focus indicator	10 levels
4	Vibration alarm	: Lights when vibration is likely to occur
5	Remaining battery level	: Displayed when the level is low
6	LED illumination area	: All : Upper half, : Lower half, : Left half, : Right half, : Off
7	LED illumination level	1 to 10 (10 levels), fixed to 10 when Hi-reflection sample mode is selected
8	Image quality mode	BASIC : JPG BASIC, NORM : JPG NORMAL, FINE : JPG FINE, TIFF : TIFF
9	Size of saved image	: 0.5M, : 2M
10	Number of exposures remaining	0 to 9999 (number of exposures remaining is also displayed)
11	Scale	0.15 mm to 3 mm (On/Off/Embedded)
12	Zoom magnification	x1 to x20 (16 levels)
13	Exposure alarm	P-OVER / P-UNDER : Over/under exposure alarm in Program AE S-OVER / S-UNDER : Over/under exposure alarm in Shutter-priority AE
14	Shutter speed	1 to 1/1000 (21 levels), 1 to 1/20000 (30 levels, when Hi-reflection sample mode is selected)
15	Camera gain	: 100 to 2250 (10 levels)
16	Exposure compensation	: -2.0 to +2.0 (1/3 steps, 13 levels)
17	Aperture mode	: Resolution-priority, : DOF-priority
18	Metering method	: Average, : Peak
19	Metering area	: Large, : Medium, : Small
20	AE lock	: Lights during AE lock
21	Continuous shooting mode	: Timer, : Best-shot selector, : Interval (Shooting interval, number of current and specified exposures are displayed.)

Playback mode

Items displayed during playback are listed below.

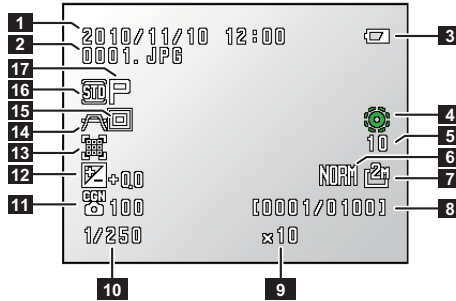


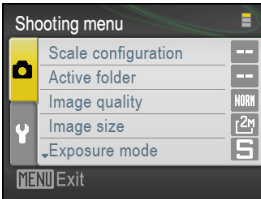
Table: Display in the playback mode

No.	Item	Content
1	Captured date and time	Date and time that the image was captured
2	File name	Name of the file
3	Remaining battery level	: Displayed when the level is low
4	LED illumination area	: All, : Upper half, : Lower half, : Left half, : Right half, : Off
5	LED illumination level	1 to 10 (10 levels), fixed to 10 in Hi-reflection sample mode
6	Image quality mode	: JPG BASIC, : JPG NORMAL, : JPG FINE, : TIFF
7	Size of saved image	: 0.5M, : 2M
8	Current exposure number	n / total-number-of-exposures
9	Zoom magnification	x1 to x20 (16 levels)
10	Shutter speed	1 to 1/1000 (21 levels) 1 to 1/20000 (30 levels, when Hi-reflection sample mode is selected)
11	Camera gain	: 100 to 2250 (10 levels)
12	Exposure compensation	: -2.0 to +2.0 (1/3 steps)
13	Aperture mode	: Resolution-priority, : DOF-priority
14	Metering method	: Average, : Peak
15	Metering area	: Large, : Medium, : Small
16	Scene mode	: Standard, : Wafer/IC chip, : Metal Ceramic, : Circuit board, : FPD (Flat Panel Display), : Hi-reflection Sample, : Custom 1 to 4, : Hi-reflection Custom 1 to 4
17	Exposure mode	: Program AE, : Shutter-priority AE, : Manual

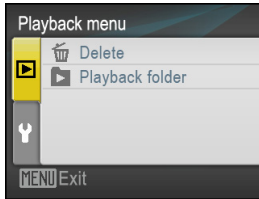
Menu screen

The P-400R has three menus, [Shooting menu], [Playback menu] and [Setup menu], for performing various settings.

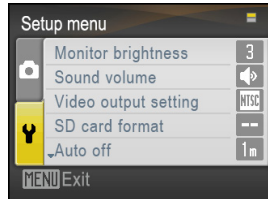
When the [MENU] button is pressed in shooting mode, the [Shooting menu] appears and in playback mode, the [Playback menu] appears. To display the [Setup menu] screen, select the [Setup menu] tab (Y) using the multi-selector in the shooting menu or playback menu.



[Shooting menu] screen

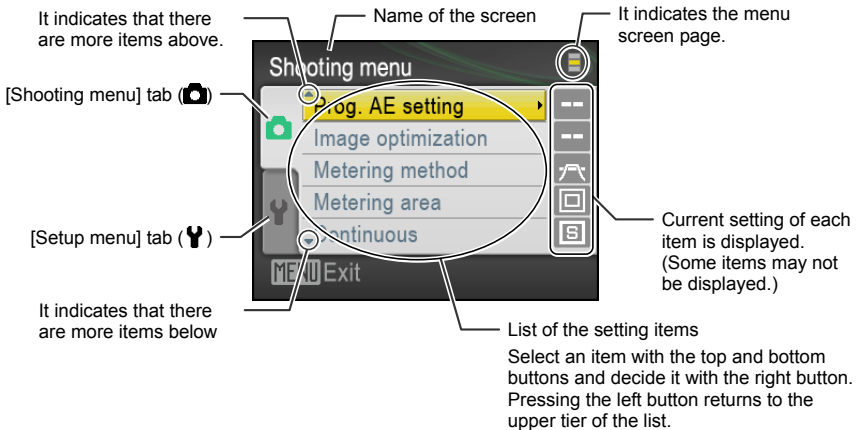


[Playback menu] screen



[Setup menu] screen

The display items on the menu screen are as follows:



Example of the menu screen display (Shooting menu)

For details on operating in each menu screen, see “5 Advanced Use of Capturing Functions”, “6 Advanced Use of Playback Functions”, and “7 Changing Settings.”

2

Preparing for Use

2.1

Preparing a Battery

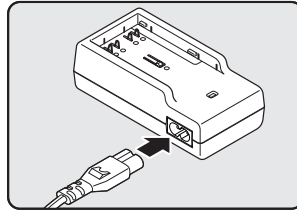
The P-400R is a battery-powered digital microscope, which allows you to observe and capture specimens or play back recorded images without any cable connections.

2.1.1

Charging a battery

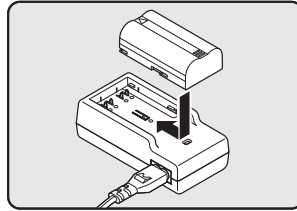
Use the dedicated P-CH01 P-BACH Battery Charger to charge a P-Li01 P-Li-ion Rechargeable Battery.

- 1 **Connect the power cord to the battery charger AC inlet, and then connect the power plug to an outlet.**



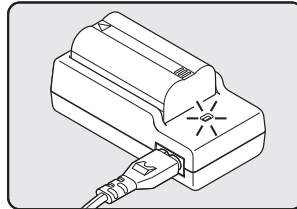
- 2 **Attach a battery to the battery charger.**

Make sure that you insert the battery in the correct orientation as shown in the illustration.

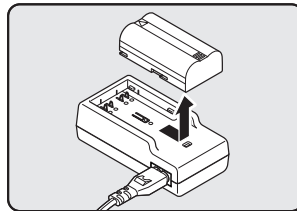


The CHARGE lamp is on while the battery is being charged.

The charging is completed when the CHARGE lamp is off. Charging a completely discharged battery requires about four hours.



- 3 **When charging of the battery is completed, remove it, and then disconnect the power plug from the outlet.**



2

Preparing for Use

CHARGE lamp status

The following table describes the statuses of the CHARGE lamp of the P-CH01 P-BACH Battery Charger.

Table: CHARGE lamp statuses

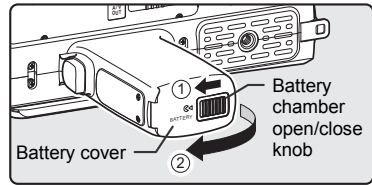
Status	Meaning	Description
On	Now charging	The battery is now being charged.
Off	Charging completed	Charging of the battery is completed.
Slow blinking	Temperature is too high or low	The temperature of the battery is too low (below 0°C) or too high (above 60°C) to charge the battery. Charge the battery at a temperature of 0 to 40°C.
Fast blinking	Battery is abnormal	Immediately disconnect the power plug from the outlet to stop charging, and contact the product vendor.

2.1.2 Inserting a battery

Insert a P-Li01 P-Li-ion Rechargeable Battery into the P-400R.

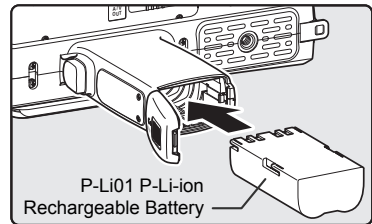
1 Open the battery cover at the bottom of the grip.

Slide the battery chamber open/close knob in the orientation as indicated in the illustration (1) to open the battery cover (2).

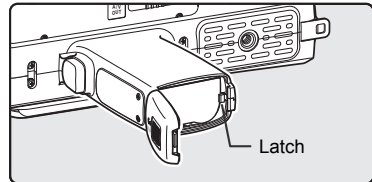


2 Insert a battery.

Insert a battery into the battery chamber in the correct orientation (terminal side first).

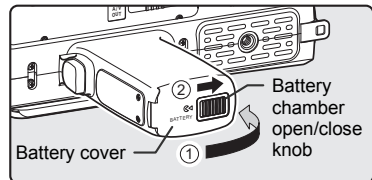


When the battery is completely inserted, it is secured by a latch.



3 Close the battery cover.

Close the battery cover (1) and shift the battery chamber open/close knob in the direction of the arrow (2) so that it returns to the original position.



Removing the battery

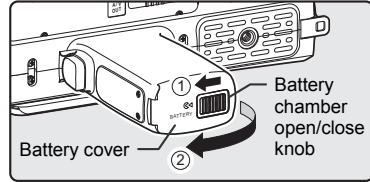
If a battery to be charged is in the P-400R Digital Microscope, remove the battery from the microscope.

1 Turn off the power to the P-400R.

Check that the power indicator is off.

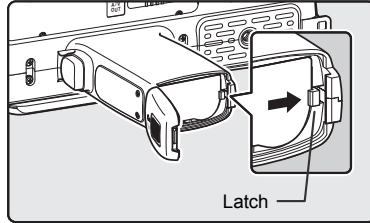
2 Open the battery cover at the bottom of the grip.

Slide the battery chamber open/close knob in the orientation as indicated in the illustration (1) to open the battery cover (2).

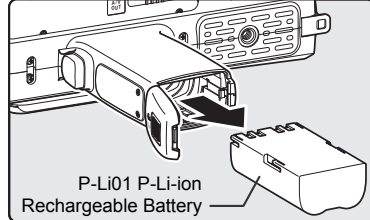


3 Release the latch that is securing the battery, and then remove the battery.

When the latch is released, the battery is pushed out of the battery chamber.

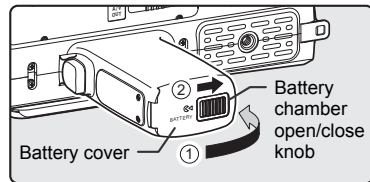


Pull out the battery straight.



4 Close the battery cover.

Close the battery cover (1) and shift the battery chamber open/close knob in the direction of the arrow (2) so that it returns to the original position.



2.1.3 Precautions for the battery and battery charger

Precautions for using the P-CH01 P-BACH Battery Charger

- When the battery is charged completely, remove it from the battery charger.
- Charge the battery in a room at a temperature of 0 to 40°C.
- The battery is not charged when its temperature is below 0°C or above 60°C.
- If the temperature of the battery is 0 to 15°C, charging might require a longer time.
- If the temperature of the battery is 0 to 15°C or 45 to 60°C, the battery capacity that can be charged might decrease.
- When the battery charger is not used, disconnect the power plug from the outlet.
- Do not shunt the battery charger terminals. Doing so may cause heat or damage.
- Make sure that the side that has the CHARGE lamp is up. In addition, do not tilt the battery charger while the battery is being charged.

Precautions for using the P-Li01 P-Li-ion Rechargeable Battery

- Before you use the battery for the first time or after it has not been used for a long time, always charge the battery with the P-CH01 P-BACH Battery Charger.
- Do not use the battery at a place whose ambient temperature is beyond the range from 0 to 40°C. Doing so might degrade battery performance or cause damage.
- The internal temperature of the battery is high immediately after it has just been used. In this case, do not charge the battery until the battery cools down. If you attempt to charge the battery when its internal temperature is high, not only the charging is impossible or incomplete, but also the battery might be deteriorated.
- Do not charge a completely charged battery again. Doing so deteriorates the battery.
- If you wave the battery charger or touch the battery during charging, the CHARGE lamp might infrequently indicate that the charging has been completed although the battery has not been charged completely because of vibration or static electricity. In this case, remove the battery, attach it again, and then restart charging.
- If an abnormal condition or a problem occurs, immediately stop the use, and ask your nearest Nikon representative for repair.

2.2 Preparing the Recording Medium

Images captured by this product can be recorded on commercially available SD memory cards (SD cards hereafter). This product supports SDHC, and can accept an SD card whose capacity is a maximum of 16 GB.

❗ miniSD cards and microSD cards cannot be used

A miniSD card and a micro SD card cannot be used via a commercially available conversion adapter in the P-400R. Use a full-size SD card.

❗ Handling an SD card

Note the following when using an SD card:

- Carefully read the instructions attached to the SD card before use.
- Do not format the SD card on a PC.
- Insert the SD card in the correct orientation.
- Do not remove the SD card or turn off the power while data is being written to the card. This may cause loss of data or malfunction of the medium.
- Some types of SD cards might not work properly. Use the medium whose operation has been proven by Nikon.
- If the SD card is not recognized, remove the card, and then insert it again. If it is still not recognized, replace the SD card with another one.
- Do not touch the terminal of the SD card with your hand or a metal object.
- Do not attach a label or sticker to the SD card.

✔ Discarding or transferring the ownership of the recording medium

Note that deleting data or formatting the SD card using this product or the 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 commercial deletion software, or initialize the medium and then completely fill it with images containing no important information (for example, pictures of empty sky).

In addition, memory can be destroyed physically to make the data unrecoverable. Care should be taken to avoid injury or damage to property when physically destroying the recording medium.

2.2.1 Preparing the SD card

Insert a commercially available SD card into the SD card slot of the P-400R.

✓ Preparing an SD card

If an SD card has not been inserted, a confirmation message is displayed on the LCD panel when the product is turned on, making further operation impossible. Before starting observation or capturing, make sure that an SD card has been inserted.

2

Preparing for Use

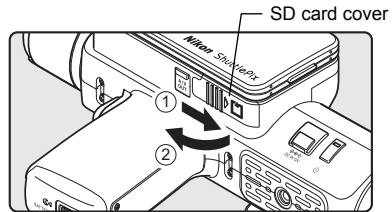
(1) Inserting the SD card

1 Turn off the power to the P-400R.

Check that the power indicator is off.

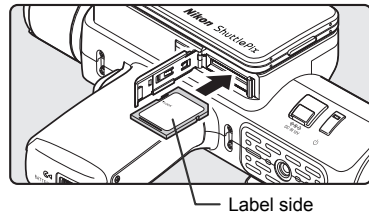
2 Open the cover of the SD card.

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



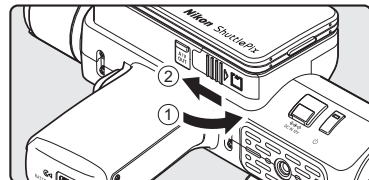
3 Insert the SD card.

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



4 Close the cover of the SD card.

Close the SD card cover to the direction of (1) and slide it to 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 to damage the SD card or the P-400R.

Removing the SD card

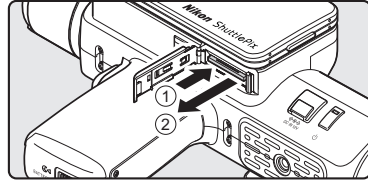
1 Turn off the power to the P-400R.

2 Open the cover of the SD card.

3 Remove the SD card.

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

4 Close the cover of the SD card.



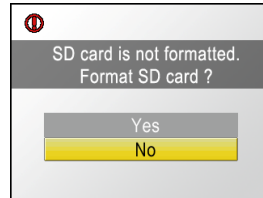
2

Preparing for Use

(2) Formatting the SD card

If the P-400R is turned on when the inserted SD card has not been formatted, a confirmation message is displayed on the LCD monitor.

This message prompts you to initialize the SD card.

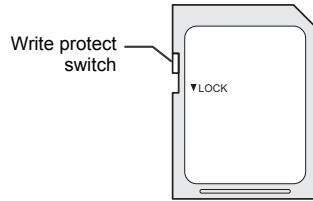


✓ Initializing the SD card

- Before using an SD card, which was used with any other device, on the P-400R, be sure to format it in the P-400R.
- After formatting, the data stored in the SD card will be all deleted. If some important data is contained in the SD card, take the backup to the personal computer, etc. before starting initialization.

Precautions for handling the SD card

- The SD card has a write protect switch. Sliding this switch to the LOCK position prohibits adding or deleting the data, thus protecting images saved in 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 power to this product while the SD card is being formatted or while data is being written, deleted or loaded.



2.2.2

Specifying an Active Folder

When an SD card is initialized in the P-400R, a sub folder "100NIKON" is created in the "DCIM" folder in the SD card, and it is automatically set as an image recording destination ("active folder").

For details on using other folders or an SD card previously used, specify a folder as needed. For the operational procedure, see "5.2 Setting the Active Folder."

2.3 Connecting an External Monitor (optional)

The optional P-CV Video Cable can be used to connect the P-400R to an external monitor such as a TV set so that the live microscopic image or captured microscopic images can be displayed on the external monitor.

✓ Video output of this product

- This product can output video output signals in either NTSC or PAL format. Select the format appropriate for the external monitor you use.
- When the P-CV Video Cable is connected to the P-400R, the LCD monitor of the P-400R is turned off.

1 Turn off the power to the P-400R.

2 Connect the P-400R to the external monitor.

Connect the mini plug of the P-CV Video Cable to the P-400R video output terminal, and the pin plug of the cable to the external input terminal of the external monitor.

A cover is attached to the P-400R video output terminal. Open it when making a connection.

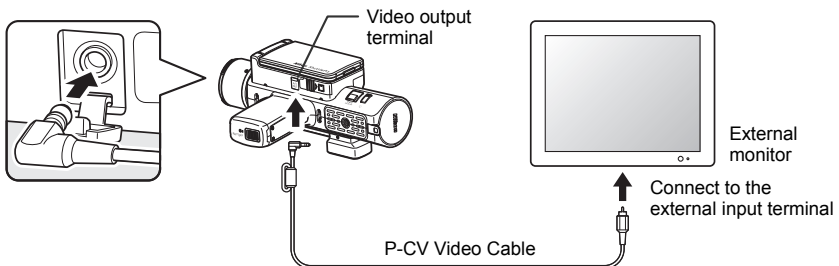
3 Turn on the external monitor power, and then switch its input to video input (external input).

For details, see the documentation for the external monitor you use.

4 Turn on the power to the P-400R, and select the video output signal format (NTSC or PAL) in the setup menu.

For details on the setting procedure, see “7.3 Selecting the Video Output Signal Format.”

The same information that is displayed in the P-400R LCD monitor is displayed on the external monitor. (At this time, the LCD monitor is turned off.)



If no image is displayed on the external monitor

In the P-400R setup menu, make sure that the video output setting appropriate for the external monitor in use is specified. For details, see “7.3 Selecting the Video Output Signal Format.”

2.4 Connecting the AC Adapter (optional)

The optional AC adapter allows the P-400R to be used with AC power. Nikon recommends using the AC adapter when performing long-time or interval shooting.



Note: Notes on the AC adaptor

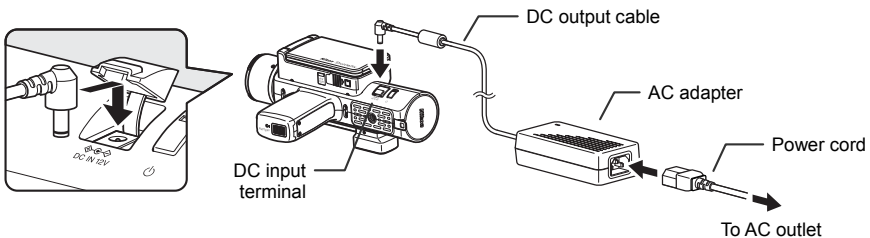
- Always use the AC adapter that is dedicated to the P-400R.
- Always use the power cord designated in "11 Major Specifications."
- Before you connect the AC adapter to the P-400R or disconnect the AC adapter from the P-400R, make sure that the P-400R power is off. If the AC adapter is connected or disconnected when the P-400R power is on, the P-400R or data might be damaged.
- The battery in the P-400R is not charged when the AC adapter is connected to the P-400R. When charging the battery that is in the P-400R, remove the battery from the P-400R, and then charge the battery with the P-CH01 P-BACH battery charger.
- When the P-400R has been installed in the P-MFSC Motorized Focusing Stand Controller, the AC adapter cannot be used. Be sure to remove the AC adapter.

1 Make sure that the P-400R power (lamp) is off.

2 Connect the DC output cable of the AC adapter to the P-400R DC input terminal.

A cover is attached to the P-400R DC input terminal. Open it when making a connection.

3 Use a designated power cord to connect the AC adapter to an AC outlet.



Usage of the AC adapter

- Because the AC adapter operates 100 to 240 VAC, 50 to 60 Hz power supply, it can be connected to any AC outlet throughout the world.
- The optional P-CAC AC Adaptor Extension Cable can be used to extend the DC output cable of the AC adapter.

2.5 Setting the Display Language and the Date and Time (At Initial Power-On)

When the power is turned on for the first time after the purchase, the [Language] menu is displayed on the LCD monitor. Make settings in accordance with the following procedure.

- 1 Select the display language using the top and bottom buttons of the multi-selector, and then press the [OK] button.**

A confirmation message for the date and time setting is displayed.

- 2 Select [Yes] using the top and bottom buttons of the multi-selector, and then press the [OK] button.**

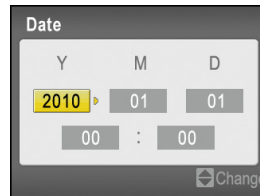
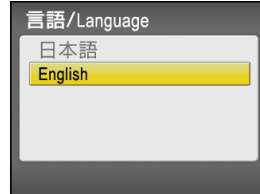
The [Date] menu is displayed.

- 3 Set date and time using the multi selector.**

Select an item with the right and left buttons, and the value with the top and bottom buttons.

- 4 When the setting is completed, press the [OK] button.**

The setting is enabled and the live image is displayed.



2

Preparing for Use

3

Basic Operations

This chapter explains you how to capture and play back images using the P-400R.

✓ For the details

This chapter explains only simple operational procedures. For details, see “4 Basic Operations for Capturing and Playing Back.”



Caution: Ring illuminator

When the P-400R power is turned on, ring illumination may automatically light. Do not point the luminous section to a person and do not look it directly.

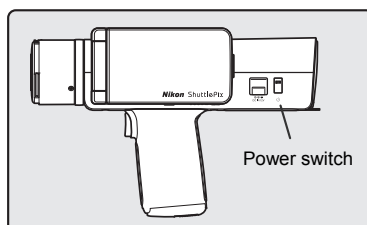
3

Basic Operations

(1) Turning on the power

1 Press the power switch to turn on the P-400R.

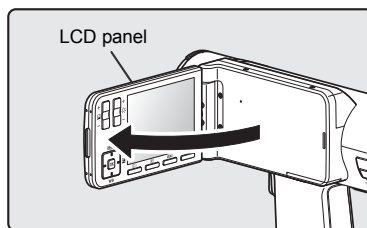
When the power is turned on, the power switch indicator lights in green with a startup sound.



(2) Directing the P-400R to the object

1 Open the LCD panel.

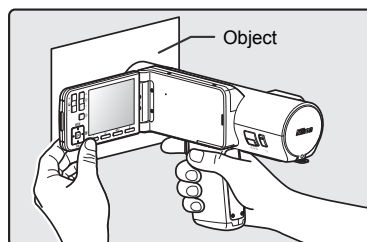
The live image is displayed on the LCD monitor.



2 Direct the P-400R to the object and adjust the position so that the object displayed on the LCD monitor is in focus.

The focus position of the P-400R is about 29 mm off the objective.

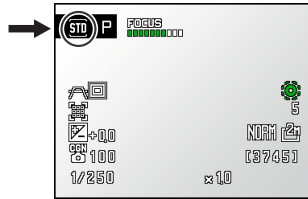
Install the P-400R in a commercially available tripod or use contact observation adapter that comes with the P-400R as required.



(3) Obtaining optimal shooting conditions

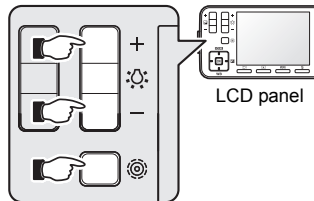
- 1 Check that [STD] is displayed on the top left of the LCD monitor.

When the scene mode is standard, [STD] is displayed. For the general objects, this mode can be used for capturing.



- 2 Make adjustment using the illumination area switching button (☉) and the light control button (☼) so that the brightness of the illumination is appropriate for the object.

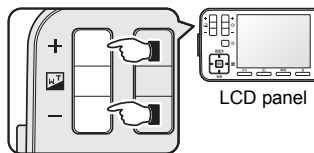
The illumination area can be adjusted by six patterns and the light control amount can be adjusted by 10 levels. The [Lighting pat.] and [Light value] menus are displayed respectively during operation.



Light control button (upper)
and Illumination area
switching button (lower)

- 3 Make adjustment using [+] / [-] of the zoom button (⏏) so that the object is displayed at a desired magnification.

The zoom magnification can be adjusted by 1.0x to 20x (16 levels). The [Zoom] menu is displayed during operation.



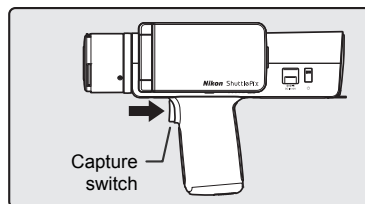
Zoom button

(4) Capturing an image

- 1 To capture an image, press the capture switch.

The image under observation is captured and saved in the SD card.

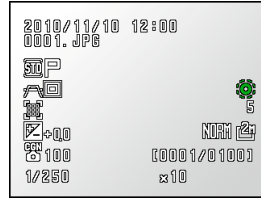
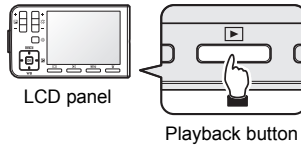
The captured image is displayed on the LCD monitor for one second and the live image appears again.



(5) Playing back the captured image

- 1 To play back the image, press the playback button (▶).**

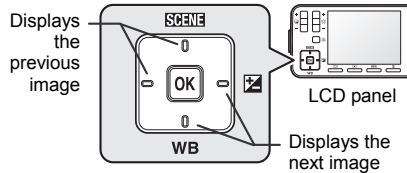
The last captured image is displayed on the LCD monitor.



The last captured image is displayed.

- 2 To switch the displayed playback image, press the right and left (or top and bottom) buttons of the multi-selector.**

When the capture switch is pressed, the P-400R enters shooting mode.

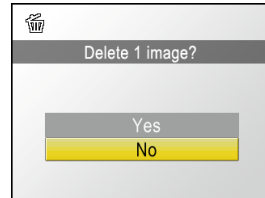
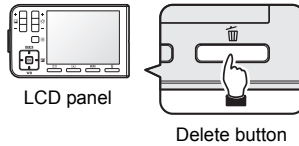


(6) Deleting captured image

- 1 Play back the image to be deleted and press the delete button (🗑️).**

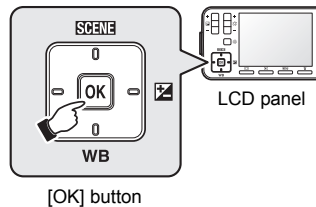
A message requesting confirmation to delete the image appears.

When the delete button is pressed in shooting mode, the last captured image is displayed and a message requesting confirmation to delete the image appears.



- 2 Select [Yes] or [No] using the top and bottom buttons of the multi-selector, and then press the [OK] button.**

If [Yes] is selected, the image is deleted.



4

Basic Operations for Capturing and Playing Back

4.1

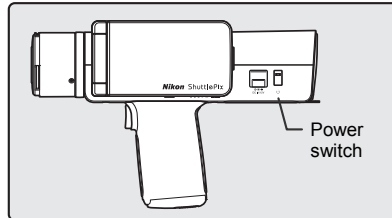
Turning On and Off the Power

Turning on the power

To turn on the power to the P-400R, press the power switch.

When the power is on, the power switch indicator lights green and the LCD monitor displays the startup screen with a startup sound.

Then, the P-400R enters shooting mode and reproduces the previous setting status. (The zoom magnification will be reset to 100%.) The live image is displayed on the LCD monitor.



* When the power is turned on for the first time, the LCD monitor displays the screen for setting the language. (See 2.5 "Setting the Display Language and the Date and Time (At Initial Power-On).")

**Note: Notes on ring illuminator**

When the power is turned on, since the P-400R reproduces the status of the previous usage, the ring illumination may be automatically turned on. Do not point the luminous section to a person and do not look directly the luminous section.

Turning off the power

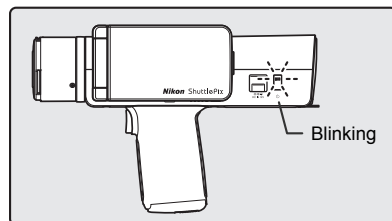
Pressing the power button when the P-400R power is on, the power is turned off. The LCD monitor and ring illuminator, and the power switch indicator are turned off.

Auto power save

When a predetermined time has passed without any operation, this product enters standby mode.

In standby mode, the power switch indicator blinks at two-second intervals.

If this product is left in standby mode for three minutes, the power to this product is automatically turned off.

**To exit standby mode**

If the power switch, the capture switch, the monitor button (⏏) or the playback button (▶) is pressed, this product exits standby mode and all operations become possible.

Checking the remaining battery charge level

When the power is turned on, the remaining battery charge level might be displayed at the top right of the LCD monitor.

The remaining battery charge level is displayed when the level is low.

Remaining battery charge level

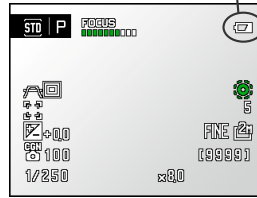


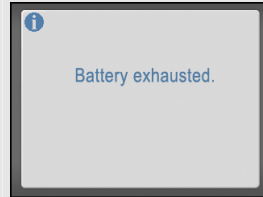
Table: Remaining battery charge level indications and meanings

Indication	Meaning
None	The remaining battery charge is enough.
Remaining battery charge level (⏻)	The remaining battery charge level is low. Prepare for charging or replacing the battery.
No battery charge remains. Replace the battery.	Operation is no longer possible. Charge or replace the battery.

⚠ When the battery has become empty

When the remaining battery charge level is near empty, the message “Battery exhausted” is displayed and then the power to this product is automatically turned off. In this status, you can no longer perform any operations such as observing and capturing images, and displaying recorded images.

To prevent data from being lost when the battery becomes empty while using the product, charge or replace the battery as early as possible if the battery icon is displayed.

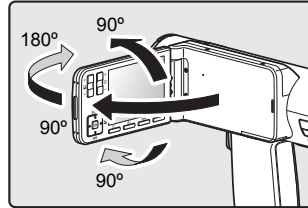


4.2 Operating the LCD Monitor

4.2.1 Opening the LCD panel

When capturing or playing back images, open the LCD panel, and adjust its angle so that the monitor is viewed clearly.

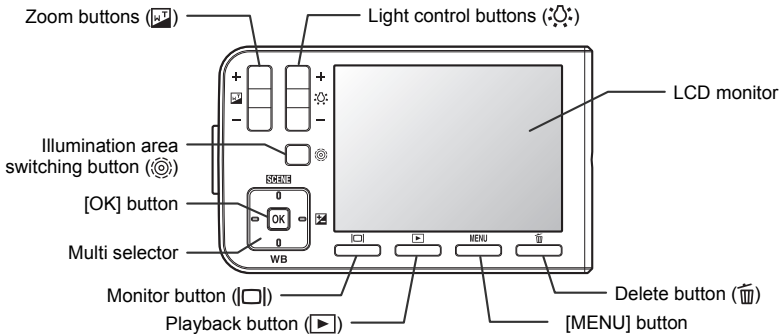
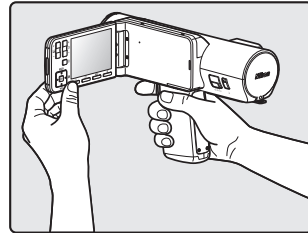
The LCD panel can rotate 180° horizontally and 90° vertically.



4.2.2 Operating the LCD panel

The LCD monitor displays not only the live image or playback image, but also various operation menus.

The menus displayed on the screen can be accessed by using the buttons on the LCD panel. Holding the back of the LCD panel, gently press the desired button.



✓ Operation sound

The operation sound is heard when a confirmation or alert message is displayed on the LCD monitor or when the setting is changed using a button on the LCD panel.

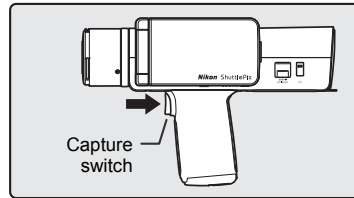
The volume of the operation sound can be changed in the setup menu. For details, see “7.2 Adjusting the Volume of the Operation Sound.”

4.3 Observing

4.3.1 Starting shooting mode

When the P-400R power is turned on, it automatically enters shooting mode.

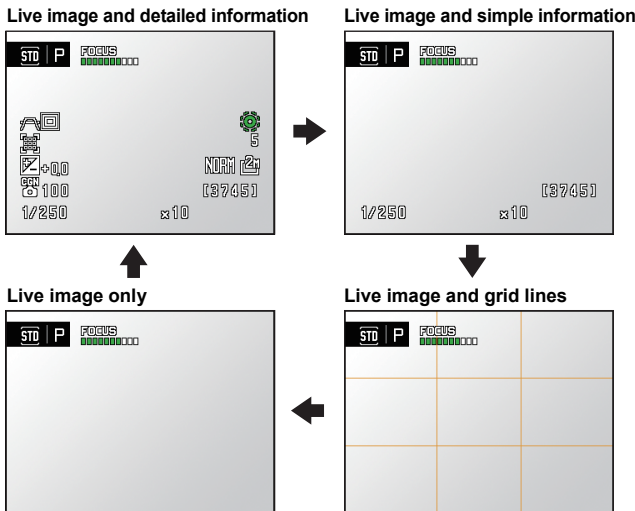
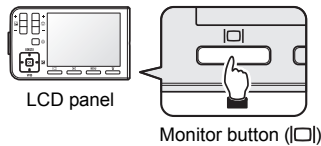
If the product is not in shooting mode, the product is placed in shooting mode by pressing the capture switch.



Switching the information items displayed in shooting mode

When the the Monitor button (\square) is pressed in shooting mode, the information items displayed on the LCD monitor switch in the following order.

Note: When a measurement scale is set to be displayed, it appears on each screen.



Displaying the shooting menu

When the P-400R is in shooting mode, pressing the [MENU] button displays the shooting menu. For details on using the shooting menu, see “5 Advanced Use of Capturing Functions.”

To terminate the display of the shooting menu, set the shooting conditions and press the [OK] button or press the [MENU] button again.

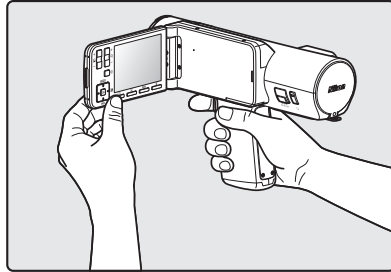
4.3.2 Directing the P-400R to the object

The focus position of the P-400R is 29 mm from the front surface of the adapter. Remove the lens cover, direct the P-400R lens to the specimen, and move the lens toward the specimen at about 29 mm off the specimen.

(1) Holding the microscope in hand

When capturing images while holding the microscope in hand, hold the grip tightly.

To reduce vibration, hold the LCD panel and the product with both hands if at all possible.



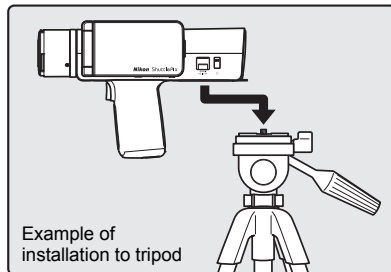
! About the strap

If the strap is attached in order not to drop the product, always insert your hand into the strap.

(2) Using the microscope with a tripod

The P-400R has a screw hole for a tripod. Attach a commercially available tripod as necessary.

Use a tripod when performing a high-magnification, long-time or interval shooting.

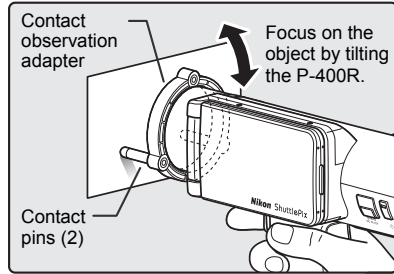


(3) Using the microscope with the contact observation adapter

When the contact observation adapter that came with the P-400R is attached, the distance between the tips of the two contact pins and the lens surface is approx. 29 mm.

Place the tips of the contact pins on the object surface and adjust the angle of the P-400R around contact pins as supporting points. The object is easily in focus.

* The tips of the contact pins are made of rubber.



❗ Using the contact observation adapter

- Be careful not to apply too much pressure to the object with contact pins.
- Do not use the contact observation adapter for observing a fragile object or an object whose surface you are not allowed to touch directly.

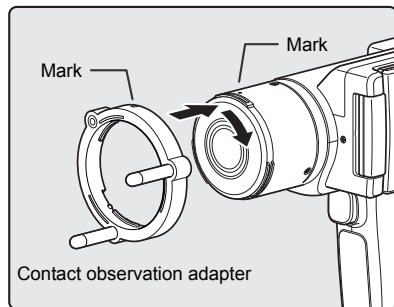
✓ Aperture setting

When you specify “DOF-priority” for the aperture mode, the range of distance that is in focus is widened so you may be able to focus on the object easily. (See “4.3.8 Changing the aperture mode.”)

Attaching and removing the contact observation adapter

To attach the contact observation adapter, align the marks, fit the adapter to the P-400R, and then rotate it clockwise until you hear a click sound and the rotation stops.

To remove the contact observation adapter, rotate it counterclockwise, and then pull it out straight.



4.3.3 Operating the illumination

The P-400R has a ring illuminator consisting of eight white LEDs around the objective.

⚠ Caution: Notes on using the ring illuminator

Note the following when using the illuminator:

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

ⓘ Illumination when observing a sample with a polished surface

When observing an object with a high reflection ratio, such as a sample with a polished surface, under low magnification, using the ring illuminator in the P-400R may reflect an LED image. In this case, use another illuminator.

(1) Switching the illumination area

Switch the illumination area of the ring illuminator as described below.

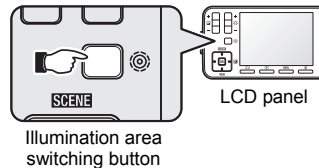
1 Press the illumination area switching button (⊙) to change the illumination area.

Pressing the illumination area switching button displays the [Lighting pat.] menu.

Every time the button is pressed, the illumination area changes in the following order:

- **ALL LEDs** (⊙) ⇒ **Upper-half LEDs** (⊙) ⇒ **Lower-half LEDs** (⊙) ⇒ **Left-half LEDs** (⊙) ⇒ **Right-half LEDs** (⊙) ⇒ **No LEDs** (⊙)

Switch the illumination area while checking the illumination state of the live image.



Illumination area switching button



[Lighting pat.] menu

If the button is pressed and held for more than one second, the illumination area changes consecutively at a 0.2 sec. interval.

While the menu is displayed, if the [OK] (or right) button is pressed or no operation is performed for two seconds, the setting is applied and the ordinary display is restored.

✓ Settings at power-on

The setting of the illumination area is saved when the power is turned off. The saved setting of the illumination area will be applied the next time the power is turned on.

(2) Adjusting brightness of the illumination

Adjust brightness of the illumination as described below.

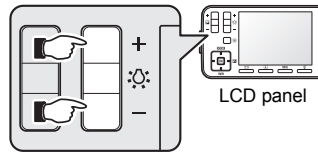
1 Press ([+]/[-]) of the light control button (⦿) to adjust brightness.

Pressing the light control button displays the [Light value] menu. In this menu, the current brightness level (ten levels) is displayed. Adjust the light while checking the brightness of the live image.

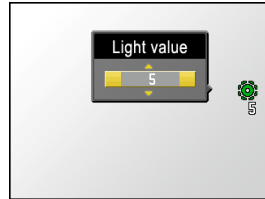
- **1 to 10 (ten levels)**

If the light control button is pressed and held for more than one second, the brightness is adjusted consecutively at a 0.2 sec. interval.

While the menu is displayed, if the [OK] (or right) button is pressed or no operation is performed for two seconds, the setting is applied and the ordinary display is restored.



Light control button



[Light value] menu

✓ 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 state, an alert message is displayed.

✓ Settings at power-on

The setting of brightness is saved when the power is turned off. The saved brightness will be applied the next time the power is turned on.

4.3.4 Using zoom

This product adopts a 20x optical zoom lens allowing 16 levels of zoom magnifications that can be set from the LCD panel.

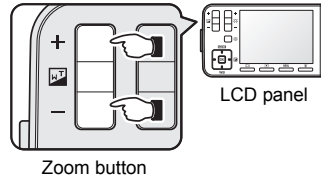
- 1 **Direct the lens to the object, and check it with the LCD monitor.**
- 2 **Press **[+]/[-]** of the zoom button  to adjust the zoom magnification.**

Pressing the zoom button displays the [ZOOM] menu. The current zoom magnification is displayed. Adjust the zoom magnification while checking it in the live image.

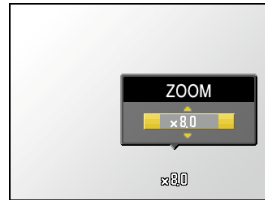
- **x1, x1.2, x1.5, x1.8, x2, x2.5, x3, x4, x5, x6, x8, x10, x12, x15, x18, x20 (16 levels)**

If the button is pressed and held over 1 second, the zoom magnification can be adjusted consecutively.

While the [Zoom] menu is displayed, if the [OK] button is pressed or no operation is performed for two seconds, the setting is applied and the ordinary display is restored.



Zoom button



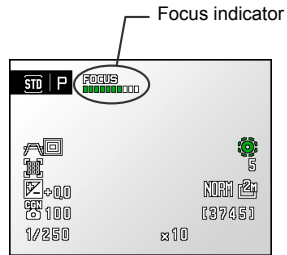
[ZOOM] menu

✓ Settings at power-on

When the power is turned off, the setting of zoom magnifications is reset. The zoom magnification will return to 100% the next time the power is turned on.

4.3.5 Checking the focus

The 10-step focus indicator is displayed at the top of the LCD monitor. The focus indicator lights depending on the focus level. This indicator assists you in focusing the object accurately.



✓ Focus indicator display

Since the P-400R has adopted the contrast detection method for the focus detection, the focus indicator lights as the object contrast becomes high.

- The focus status of the actual image may differ from the display of the focus indicator.
- When the following objects are used, the lighting number of the focus indicator steps may be decreased even though focus is achieved.
 - Low contrast object
 - Object with regular vertical lines

✓ P-400R focus position

The P-400R focus position is 29 mm off the end of the objective. Adjust the position of the P-400R so that the object is 29 mm off the objective.

When the contact observation adapter is attached, the surface, to which the tips of the contact pins contact, comes to the focus position.

4.3.6 Selecting a scene mode suitable to the specimen

Several scene modes are provided in accordance with typical specimens. Selecting a scene mode can use the setting suitable to the specimen.

- 1 Make sure that the product is in shooting mode.**
- 2 Display the scene mode selection menu using the top button (SCENE) of the multi-selector.**

The scene mode, custom setting, and aperture mode icons appear.

- 3 Select the scene selection icon using the top and bottom buttons of the multi-selector.**

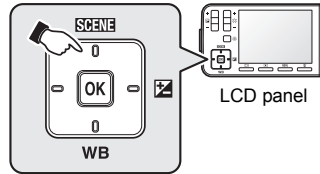
- 4 Select the desired scene mode using the right and left buttons of the multi-selector.**

There are six scene modes. (See the following table.)

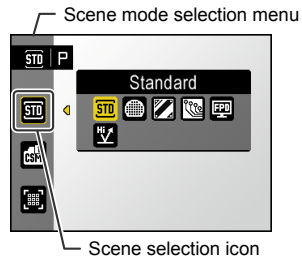
- 5 Press the [OK] button to apply the selection.**

The live image is displayed again. The icon for the selected scene mode is displayed at the top left of the screen.

If no operation is performed for two seconds, the selection is cancelled and the live image appears again.



Top button



Scene selection icon

Icon	Scene mode	Meaning
	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. Clipping of highlights in component leads and solder joints is suppressed, allowing defects to be easily detected. This mode is also suitable for high-contrast subjects 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.
	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 selection of scene mode is saved when the power is turned off. Next time the power is turned on, the previously selected scene mode is selected again.

✔ Changing the scene mode setting

- After a scene mode is selected, settings such as the exposure mode, exposure compensation, camera gain, and shutter speed can be changed. However, those changes cannot be saved in the scene mode.
- To save the shooting conditions, use “custom setting.” For details on using custom settings, see “4.3.7 Using custom settings”, and for registration, see “5.12 Registering a Custom Definition.”

✔ Flickering during observation

Flickering may occur in the live image depending on the object to be observed. (This is noticeable in a color chart that has an even color.)

- Change the exposure mode to Manual and make the shutter speed slower.
- Make the illumination brighter.

If the shutter speed is too slow or the illumination is too bright, overexposure occurs. Adjust them while checking them in the live image to obtain appropriate exposure.

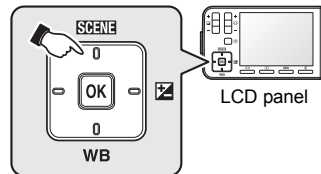
4.3.7 Using custom settings

A maximum of four kinds of shooting conditions can be registered as “custom settings.” One of four kinds of settings registered as Custom 1 to Custom 4 can be reproduced by selecting Custom 1 to Custom 4 for the scene mode.

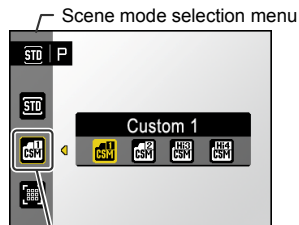
✓ Registering custom settings

For details on registering custom settings, see “5.12 Registering a Custom Definition.”

- 1 **Make sure that the product is in shooting mode.**
- 2 **Display the scene mode selection menu using the top button (SCENE) of the multi-selector.**
The scene mode, custom setting, and aperture mode icons appear.
- 3 **Select the custom setting selection icon using the top and bottom buttons of the multi-selector.**
- 4 **Select the desired kind of custom settings using the right and left buttons of the multi-selector.**
 - **Custom 1 to 4**
Reproduces one kind of registered custom settings.



Top button



Custom setting selection icon

- 5 **Press the [OK] button to apply the selection.**

The live image is displayed again. The icon for the selected kind of custom settings is displayed at the top left of the screen.

If no operation is performed for two seconds, the selection is cancelled and the live image appears again.

✓ 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.”



Standard custom setting



Hi-reflection custom setting

✓ Settings at power-on

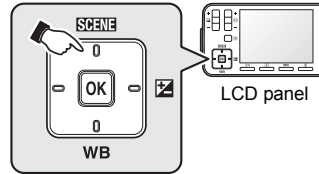
The selection of custom settings is saved when the power is turned off. Next time the power is turned on, the previously selected kind of custom settings is selected again.

4.3.8 Changing the aperture mode

Select either [Resolution-priority] or [DOF-priority] as the aperture mode for shooting.

- 1 **Make sure that the product is in shooting mode.**
- 2 **Display the scene mode selection menu using the top button (SCENE) of the multi-selector.**

The scene mode, custom setting, and aperture mode icons appear.



Top button

- 3 **Select the aperture mode selection icon using the top and bottom buttons of the multi-selector.**

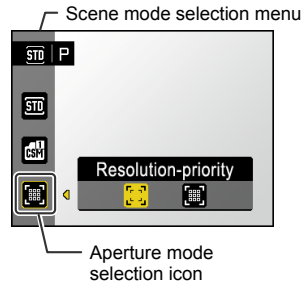
- 4 **Select the desired aperture mode using the right and left buttons of the multi-selector.**

- [Resolution-priority]
- [DOF-priority]

- 5 **Press the [OK] button to apply the selection.**

The live image is displayed again. The icon for the selected aperture mode is displayed on the left of the screen.

If no operation is performed for two seconds, the selection is cancelled and the live image appears again.



Aperture mode selection icon

✓ [Resolution-priority] and [DOF-priority] modes

The following explains the difference between Resolution-priority mode and DOF-priority mode.

- **Resolution-priority mode:**
The depth of field (range of distance that is in focus) is shallow, but the resolution of the image is higher.
- **DOF-priority mode:**
The resolution is lowered a little, but the depth of field (range of distance that is in focus) is deeper.

✓ Settings at power-on

The setting of aperture mode is not saved when the power is turned off. When the power is turned on, Resolution-priority mode is automatically selected.

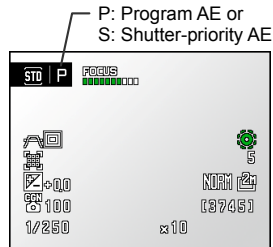
4.3.9 Adjusting the exposure

(1) Compensating the exposure

When the exposure mode is Program AE or Shutter-priority AE, the exposure can be adjusted by exposure compensation. Exposure compensation is a function that allows you to adjust the brightness of the screen by manually changing the exposure automatically calculated by the P-400R.

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

The current exposure mode is displayed at the top left of the LCD monitor. (Program AE: **P**, Shutter-priority AE: **S**)



Shooting mode

2 Press the right button (Exposure compensation) of the multi-selector.

The [Exposure comp.] menu is displayed.

3 Adjust the exposure compensation value using the top and bottom buttons of the multi-selector, and press the [OK] (or right) button to apply the value you set.

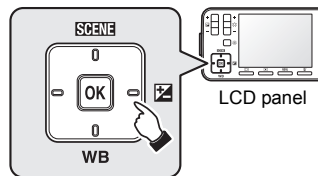
Adjust the exposure while checking it in the live image.

- **±2.0, 1/3 steps**

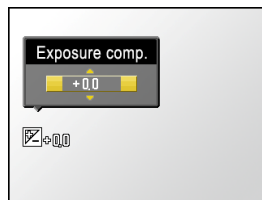
Holding down either of the top and bottom buttons for one second or more continuously changes the value every 0.2 seconds.

While the menu is displayed, if the [OK] (or right) button is pressed, the setting is applied and the menu disappears.

If no operation is performed for two seconds, the setting is applied and the ordinary display is restored.



Right button



[Exposure comp.] menu

✓ Settings at power-on

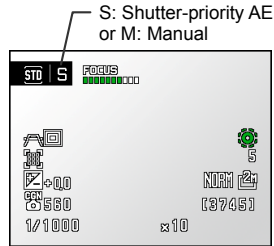
The setting of exposure compensation is saved when the power is turned off. The saved exposure compensation value will be applied the next time the power is turned on.

(2) Setting the shutter speed

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

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

The current exposure mode is displayed at the top left of the LCD monitor.
(Shutter-priority AE: **S**, Manual: **M**)



2 Press the left button of the multi-selector.

The [Shutter speed] menu is displayed.

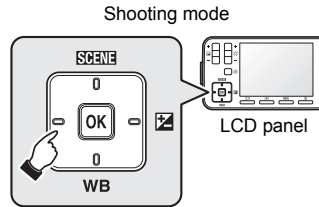
3 Adjust the shutter speed using the top and bottom buttons of the multi-selector and press the [OK] (or right) button to apply the value you set.

Adjust the shutter speed while checking it in the live image.

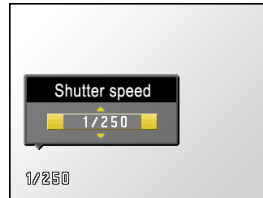
- 1/1000, 1/700, 1/500, 1/350, 1/250, 1/180, 1/125, 1/90, 1/60, 1/40, 1/30, 1/20, 1/15, 1/10, 1/8, 1/6, 1/4, 1/3, 1/2, 1/1.5, 1 (unit: second, factory default: 1/60)

Holding down either of the top and bottom buttons for one second or more continuously changes the value every 0.2 seconds.

While the menu is displayed, if the [OK] (or right) button is pressed, or no operation is performed for two seconds, the setting is applied and the ordinary display is restored.



Left button



[Shutter speed] menu

✓ 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 1 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)

✓ Settings at power-on

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

(3) Setting the camera gain

When the exposure mode is Manual, the exposure can be set arbitrarily with the shutter speed and camera gain. The camera gain is used to set the sensitivity of the P-400R. When a higher value is set for the camera gain, darker objects can be captured. Note that higher sensitivity is likely to cause more noise in the image.

✓ Adjusting the exposure and setting the aperture

The P-400R uses a combination of the shutter speed and the camera gain to determine the exposure. The aperture is fixed to either Resolution-priority or DOF-priority.

1 Check that the exposure mode is Manual.

The current exposure mode is displayed at the top left of the LCD monitor. (Manual:



2 Press the right button (⏏): exposure compensation) of the multi-selector.

The [Camera gain] menu is displayed.

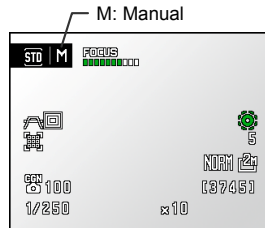
3 Adjust the camera gain using the top and bottom buttons of the multi-selector.

Adjust the camera gain while checking it in the live image.

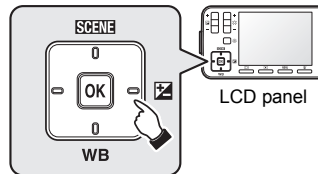
- 100, 140, 200, 280, 400, 560, 800, 1130, 1600, 2250 (factory default: 100)

Holding down either of the top and bottom buttons for one second or more continuously changes the value every 0.2 seconds.

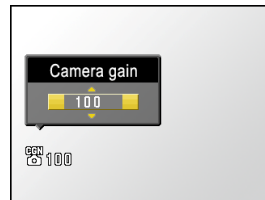
While the menu is displayed, if the [OK] (or right) button is pressed, or no operation is performed for two seconds, the setting is applied and the ordinary display is restored.



Shooting mode



Right button



[Camera gain] menu

✓ Settings at power-on

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

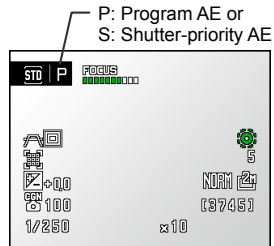
(4) Using the AE lock

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 in the case where 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.

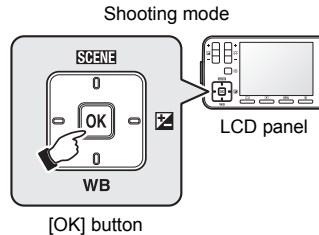
The current exposure mode is displayed at the top left of the LCD monitor. (Program AE: **P**, Shutter-priority AE: **S**)

Change the metering range as necessary. For details, see “5.9 Switching the Metering Area.”



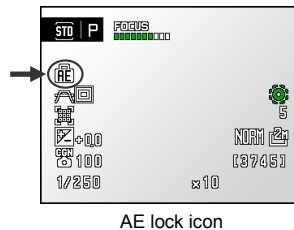
2 Press the [OK] button at the position whose exposure you want to lock.

The exposure at that time is locked, and the AE lock icon (**AE**) is displayed in the LCD monitor.



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

The AE lock icon disappears.



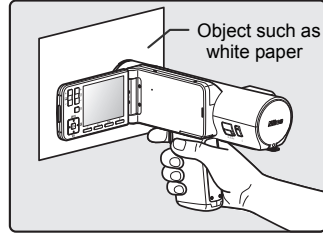
✓ Automatic release of the AE lock

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

4.3.10 Setting the white balance

White balance is the process of correcting color bias depending on the light source and adjusting the color of white so that white objects appear really white in the image. The P-400R allows you to adjust the white balance manually.

- 1 **Prepare a sheet of white paper or a similar thing as the object, and adjust the position of the microscope so that the object fills within the metering area.**

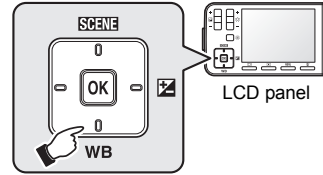


- 2 **Adjust the illumination to set the light condition for observation/capturing.**

- 3 **Press the bottom button (WB) of the multi-selector.**

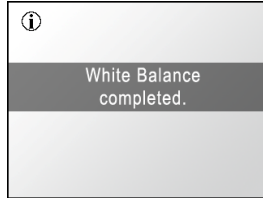
The white balance is obtained from the view of the object when the button is pressed.

After the message "White Balance completed." is displayed on the LCD monitor, the ordinary display is restored.



Bottom button

- 4 **Check the result with the live image on the LCD monitor.**



✓ White balance measuring area

The area used to obtain the white balance is the same as the metering area. For details on setting the metering area, see "5.9 Switching the Metering Area."

4.4 Capturing the Image under Observation

✓ Checking the active folder

Microscopic images are saved in the preset active folder.

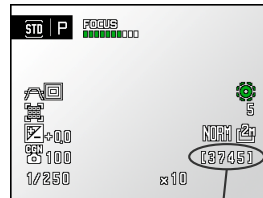
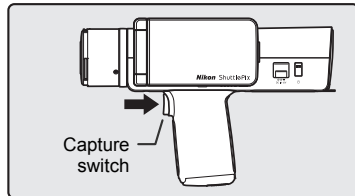
If necessary, check the active folder settings by referring to “5.2 Setting the Active Folder.”

4.4.1 Capturing an image

To capture an image, press the capture switch in shooting mode.

When the capture switch is pressed, the image is saved in the SD card with a capture sound. The LCD monitor is temporarily turned off and the captured image is displayed on the LCD monitor for one second. Then the live image appears again.

The number of exposures remaining is displayed at the bottom right of the LCD monitor.



Number of exposures remaining

❗ Precautions for saving images

While an image is being recorded, the number of exposures remaining displayed on the LCD monitor and the power switch indicator blink. While they are blinking, do not open the battery cover or remove the SD card. Doing so may cause improper image recording or damage to the P-400R or to the SD card.

✓ To change the capture sound volume

The volume of shutter and operation sounds can be changed in the setup menu. For details, see “7.2 Adjusting the Volume of the Operation Sound.”

✓ Maximum number of files

A maximum of 9999 images can be saved in the SD card. When the number of files reaches the upper limit, a message that prompts you to delete images or replace the SD card is displayed.

Using continuous shooting mode

The P-400R has the single-frame shooting function as well as the following shooting functions.

- **Best-shot selector function**

Up to ten images are captured while pressing the capture switch, and only the file with the maximum file size is saved. Generally, the fine image without being blurred or out of focus has a large data amount. This function is effective only when JPG is specified for the image mode.

- **Self timer function**

The shutter is released 2 seconds after the capture switch is pressed. Pressing the capture switch shows a countdown display on the LCD monitor, and when it shows 0 sec., image capturing is started.

- **Interval shooting function**

Single-frame shooting is performed continuously with a specified interval for a specified number of shots. This is useful to see how the object changes with time.

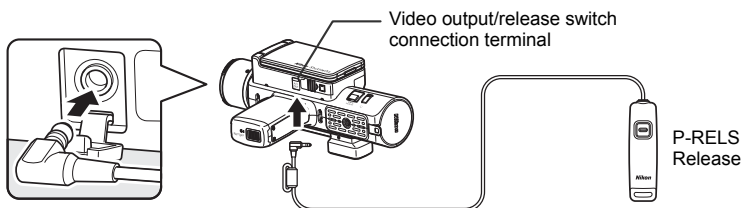
✓ To switch continuous shooting mode

For details on switching continuous shooting mode, see “5.10 Using Continuous Shooting Mode.”

Using the release switch

Even when the P-400R has been attached to a tripod, vibration might occur when the capture switch is pressed. In this case, using the optional P-RELS Release is recommended.

Turn off the P-400R before connecting the P-RELS Release to the P-400R video output/release switch connection terminal. Turning on the P-400R enables operation with the P-RELS Release.



When the P-RELS Release is connected while one of NTSC and PAL is set for the video output signal of the P-400R, the LCD monitor display is turned off. When using the P-RELS Release, set the video output signal to off. (For the setting procedure, see “7.3 Selecting the Video Output Signal Format.”)

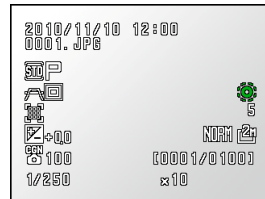
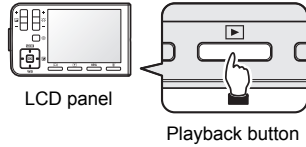
* The best-shot selector and timer functions are also useful for reducing vibration.

4.5 Playing Back Captured Images

4.5.1 Starting playback mode

When the playback button (▶) is pressed in shooting mode, the P-400R enters playback mode, and the last captured image is displayed on the LCD monitor.

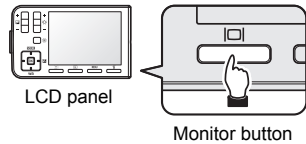
When the playback button is pressed again or the capture switch is pressed, the P-400R enters shooting mode again.



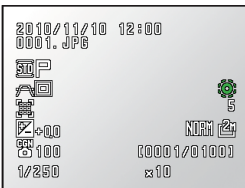
The last captured image is displayed.

Changing the items displayed in playback mode

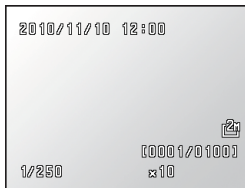
When the monitor button (□) is pressed in playback mode, the information items displayed on the LCD monitor change in the following order.



A saved image and its detailed information



A saved image and its simple information



A saved image only



Displaying the playback menu

When the [MENU] button is pressed in playback mode, the playback menu is displayed. For details on using the playback menu, see “6 Advanced Use of Playback Functions.”

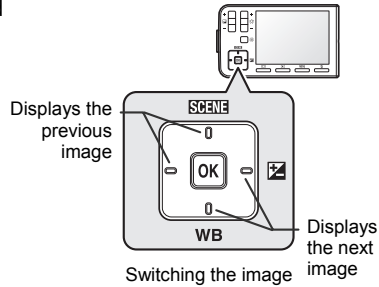
To exit the playback menu, press the playback button (▶) again.

4.5.2 Switching the image

Use the multi-selector to switch the displayed playback image.

Pressing the top or left button of the multi-selector displays the previous image, and pressing the bottom or right button displays the next image.

When the first image is displayed, pressing the top or left button of the multi-selector displays the last image. Similarly, when the last image is displayed, pressing the bottom or right button of the multi-selector displays the first image.




4

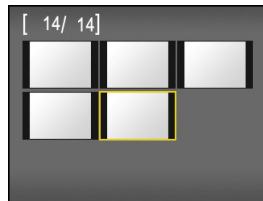
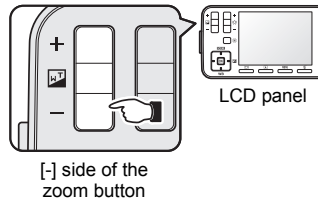
✓ Playing back images at fast speed

Pressing and holding down any of the multi-selector buttons for at least three or seconds plays back images at fast speed.

4.5.3 Displaying thumbnail images

When the [-] side of the zoom button () is pressed in playback mode, the screen changes to the thumbnail view in which nine thumbnail images are displayed.

- Pressing the [+] side of the zoom button exits the thumbnail view, and the full-screen view is restored.
- Selecting an image using the multi-selector and pressing the [OK] button displays the selected image in the full-screen view.




Thumbnail display

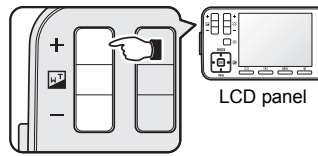
✓ Deleting an image from the thumbnail view

The selected image can be deleted by pressing the [Delete] button in the thumbnail view. When a confirmation message appears, press [Yes] or [No], and then press the [OK] button.

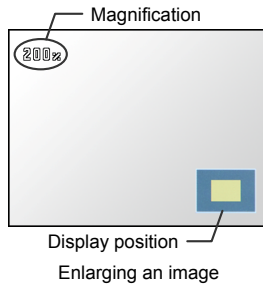
4.5.4 Enlarging an image

When the [+] side of the zoom button () is pressed in playback mode, the displayed image is magnified.

- Normally, the image is displayed at magnification of 100%. Pressing [+] repeatedly changes the magnification in the following order: 140%, 200%, 280%, 400%, 560%, 800%, 1000%, 1600%.
- The zoom magnification is increased by pressing the [+] side of the zoom button, and decreased by pressing the [-] side. If holding down either side for one second or more, the zoom magnification changes sequentially.
- When an image is being magnified, the magnification is displayed at the top left of the screen, and the magnified-area indicator is displayed at the bottom right of the screen.
- The multi-selector can be used to move the area to be magnified.
- Pressing the [OK] button resets the magnification to 100%.



[+] side of the zoom button




Display position

Enlarging an image

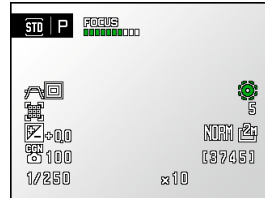
4.6 Deleting Captured Images

4.6.1 Deleting the image that has just been captured

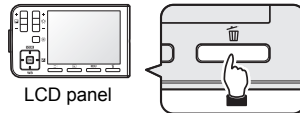
To delete the last image captured in shooting mode, perform the following procedure.

- 1 In shooting mode, press the delete button (.

The last saved image and a message asking you whether you really want to delete the image are displayed on the LCD monitor.



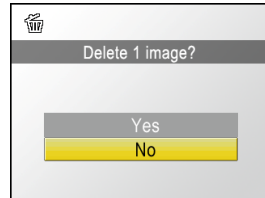
Shooting mode



LCD panel

Delete button

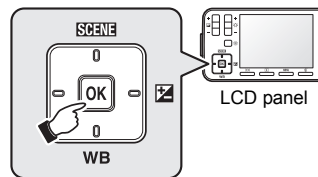
- 2 Select [Yes] or [No] using the top and bottom buttons of the multi-selector.



- 3 Press the [OK] button or the right button of the multi-selector to apply the selection.

If [Yes] was selected, the image is deleted and a completion message is displayed for two seconds.


The live image appears again.



LCD panel

[OK] button

✓ When no images have been saved

When no images have been saved, if the delete button () is pressed, the message "No image" is displayed, and the live image is displayed.

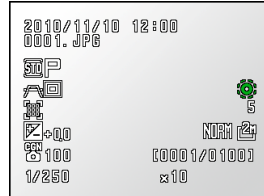
4.6.2 Deleting the currently displayed image

To delete an image in playback mode, perform the following procedure.

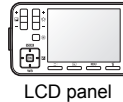
- 1 In playback mode, display the image to be deleted.

- 2 Press the delete button (🗑️).

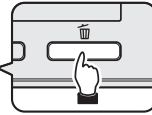
A message requesting confirmation to delete the image is displayed.



Playback mode

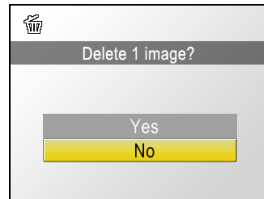


LCD panel



Delete button

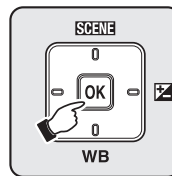
- 3 Select [Yes] or [No] using the top and bottom buttons of the multi-selector.



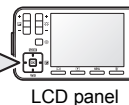
- 4 Press the [OK] button or the right button of the multi-selector to apply the selection.

If [Yes] was selected, the image is deleted and a completion message is displayed for two seconds.

The [Playback menu] screen appears again and the previous or next image of the deleted image is displayed.




[OK] button



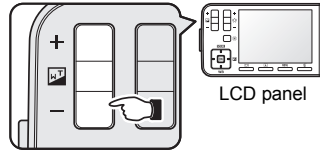
LCD panel

4.6.3 Deleting the currently displayed image

To delete an image from the thumbnail view, perform the following procedure.

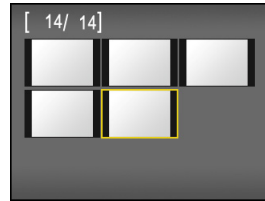
- 1 Press [-] of the [Zoom] button () during image playback to display the thumbnail view.

Pressing [+] of the [Zoom] button changes the view to the single image view.



[-] side of the zoom button

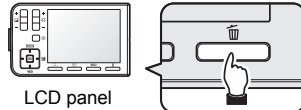
- 2 Select the image to be deleted using the multi-selector.



Thumbnail display

- 3 Press the delete button ().

A message requesting confirmation to delete the image is displayed.

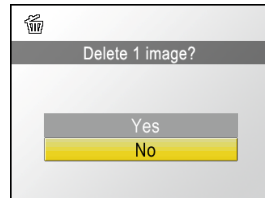


LCD panel

Delete button

- 4 Select [Yes] or [No] using the top and bottom buttons of the multi-selector.

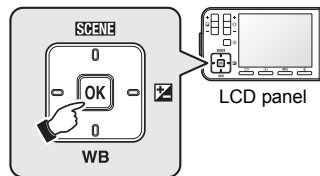
Select [Yes] to delete the selected image, or select [No] to cancel the deletion.



- 5 Press the [OK] button or the right button of the multi-selector to apply the selection.

If [Yes] was selected, the image is deleted and a completion message is displayed for two seconds.

The thumbnail view appears again.



[OK] button

5

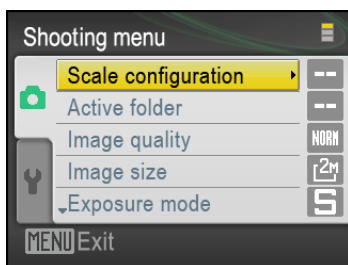
Advanced Use of Capturing Functions

Using the shooting menu

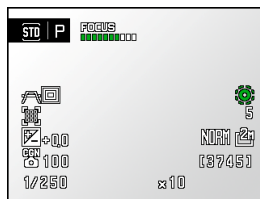
Detailed settings for shooting conditions are specified by using the shooting menu.

Displaying the shooting menu

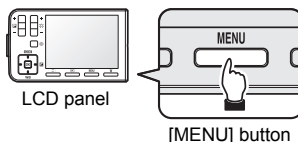
In shooting mode, pressing the [MENU] button displays the [Shooting menu] screen. The shooting menu is displayed on this screen.



[Shooting menu] screen



Shooting mode

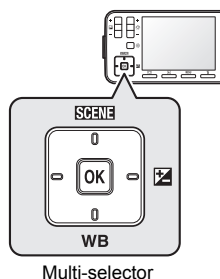


Using the shooting menu

The shooting menu is operated by using the multi-selector on the LCD panel.

Select the item using the top and bottom buttons of the multi-selector, and then press the right (or [OK]) button to apply the selection.

Pressing the left button redisplay the upper-level menu item.



Restarting shooting mode

If the [MENU] button or the capture switch is pressed when the shooting menu is displayed, the P-400R is placed in shooting mode again, and the live image is displayed on the LCD monitor.

Operations that can be performed using the shooting menu

Table: Operations that can be performed using the shooting menu

Section	Item	Description	Page
5.1	Setting the Measurement Scale	The measurement scale settings can be specified. A measurement scale type and the line width can be selected, and whether to show/hide the scale and whether to embed the scale in the image can be selected.	51
5.2	Setting the Active Folder	The folder in which captured images will be saved can be specified.	53
5.3	Selecting the Image Quality Mode	The quality of images to be recorded can be selected from TIFF, JPG FINE, JPG NORMAL, and JPG BASIC.	55
5.4	Selecting the Image Size	The size of images to be recorded can be selected from 2M and 0.5M.	56
5.5	Selecting the Exposure Mode	The exposure mode can be selected from Program AE, Shutter-priority AE, and Manual.	57
5.6	Program AE Settings	The upper limit on the camera gain and the lower limit on the shutter speed in Program AE mode can be set.	58
5.7	Setting the Quality of Images to be Captured	The image quality settings for observation or capturing can be specified. The settings that can be specified are chroma, hue, contrast, sharpness, color effect, and RB adjustment.	60
5.8	Switching the Metering Method	The metering method can be switched between averaging metering and peak-hold metering methods.	63
5.9	Switching the Metering Area	The size of the area used for metering can be selected from Large, Middle, and Spot.	64
5.10	Using Continuous Shooting Mode	The continuous shooting mode can be selected from Single, Best Shot Selector, Self-timer, and Interval shooting.	65
5.11	Correcting Shading	Whether compensation for image shading is enabled or disabled can be selected.	67
5.12	Registering a Custom Definition	A maximum of four sets of shooting conditions can be registered as custom definitions.	68

5.1 Setting the Measurement Scale

Specify the settings for the measurement scale displayed during observation or capturing.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.

- 2 Select [Scale configuration], and then press the [OK] (or right) button.

The [Scale configuration] screen appears.

- 3 Select the desired category, and then press the [OK] (or right) button.

The menu for the selected category appears.

- 4 Specify the setting using the multi-selector.

The following shows the categories and the settings that can be specified.

- **Scale display**

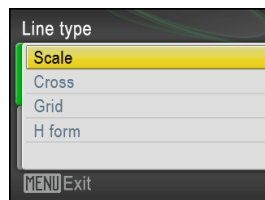
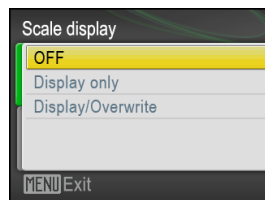
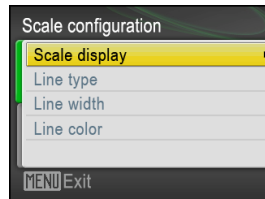
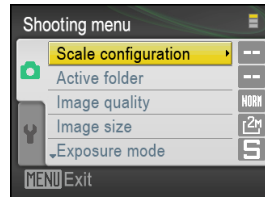
- OFF (initial setting)
- Display only
- Display/Overwrite

If [Display/Overwrite] is selected, the scale is embedded in saved images.

- **Line type**

- Scale (initial setting)
- Cross
- Grid
- H form

See “Measurement scale display” on the next page for details on the display of the measurement scales.



- **Line width**

- Thick
- Thin (initial setting)



- **Line color**

Red, Green, Yellow, Blue, White, or Black (initial setting: Green)



5

5 Press the [OK] (or right) button to apply the specified settings.

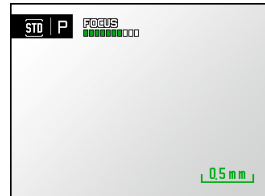
The [Shooting menu] screen appears again.

✓ Measurement scale display

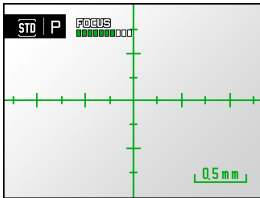
Four types of measurement scales are available: [Scale], [Cross], [Grid] and [H form].

When [Scale] is selected, a scale bar is displayed at the bottom right of the screen.

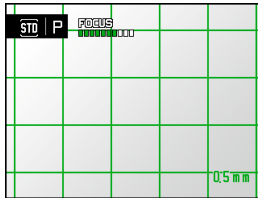
When [Cross], [Grid] or [H form] is selected, the selected scale is displayed with a scale bar at the bottom right of the screen.



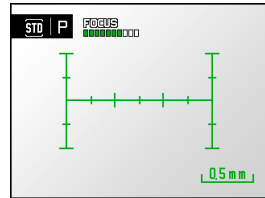
[Scale]



[Cross]



[Grid]



[H form]

5.2 Setting the Active Folder

Specify the folder in which images will be saved.

✓ Location and name of the active folder

The active folder is created in the DCIM folder on the SD card. The format of the folder name is nnnNIKON (nnn: three-digit number).

5.2.1 Creating a new folder

Create a new folder and set it as the active folder.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.

- 2 Select [Active folder], and then press the [OK] or right) button.

The [Active folder] screen appears.

- 3 Select [Create a new folder], and then press the [OK] (or right) button.

The [Create a new folder] screen appears.

- 4 Enter a three-digit number using the multi-selector.

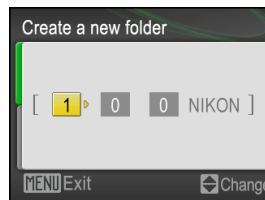
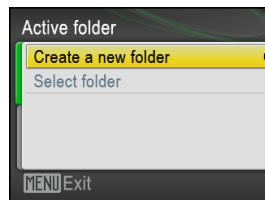
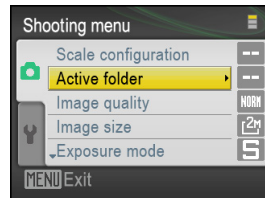
- **Folder name (initial value: 100NIKON)**

The folder name format is nnnNIKON (nnn: three-digit number). Any one-digit numeric value can be set for each digit. The digit can be selected by using the right and left buttons. The numeric value can be selected by using the top and bottom buttons.

- 5 Press the [OK] (or right) button.

A new folder is created and set as the active folder. If a folder with the same name as the new folder already exists, a warning message appears.

The [Shooting menu] screen appears again.



✓ A new folder is automatically created in the following cases:

- When the SD card is initialized.
- When the number of files in one folder reaches 200.
- When the largest image file number in the current active folder reaches 9999.

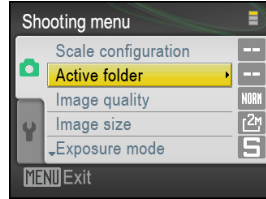
The three-digit number to be assigned to an automatically created folder starts with 100. If there are already 100NIKON and 105NIKON folders, a folder named 101NIKON will be created automatically.

5.2.2 Setting an existing folder as the active folder

Set an existing folder as the active folder.

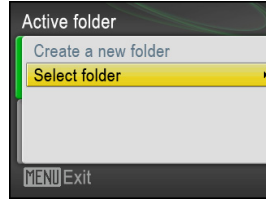
- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.
- 2 Select [Active folder], and then press the [OK] (or right) button.

The [Active folder] screen appears.



- 3 Select [Select folder], and then press the [OK] (or right) button.

The [Select folder] screen, that lists the three-digit numbers of the folders saved on the SD card, appears.

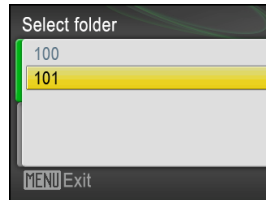


- 4 Select the folder to be used as the active folder.

- 5 Press the [OK] (or right) button.

The selected folder is set as the active folder.

The [Shooting menu] screen appears again.



✓ Maximum number of folders

A maximum of 900 folders (100NIKON to 999NIKON) can be created on a SD card. When the number of created folders reaches the maximum, a message that prompts you to delete unnecessary folders or replace the SD card appears.

5.3 Selecting the Image Quality Mode

Select the image quality mode used when recording images.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.

- 2 Select [Image quality], and then press the [OK] (or right) button.

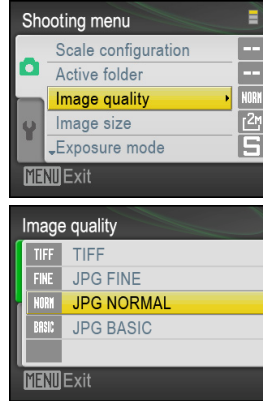
The [Image quality] screen appears.

- 3 Select one of the following image quality modes:

- **TIFF**
Images are recorded in 8-bit, non-compressed TIFF-RGB format.
- **JPG FINE**
Images are recorded in JPEG format at the compression rate of about 1/4.
- **JPG NORMAL (initial setting)**
Images are recorded in JPEG format at the compression rate of about 1/8.
- **JPG BASIC**
Images are recorded in JPEG format at the compression rate of about 1/16.

- 4 Press the [OK] (or right) button to apply the selection.

The [Shooting menu] screen appears again.



✓ Recorded image files

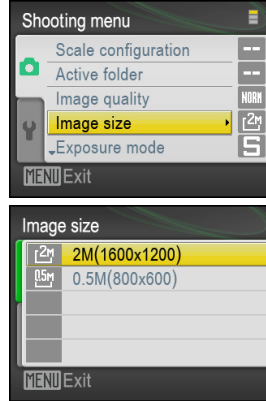
- If TIFF mode is selected, TIFF header files are saved.
- If a TIFF or JPG mode (FINE, NORMAL, or BASIC) is selected, Exif 2.2 data is inserted into files.

5.4 Selecting the Image Size

Set the size of images to be recorded.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.
- 2 Select [Image size], and then press the [OK] (or right) button.
The [Image size] screen appears.
- 3 Select either of the following image sizes:
 - **2M (1600 x 1200) (initial setting)**
1600 x 1200 pixels
 - **0.5M (800 x 600)**
800 x 600 pixels
- 4 Press the [OK] (or right) button to apply the selection.

The [Shooting menu] screen appears again.

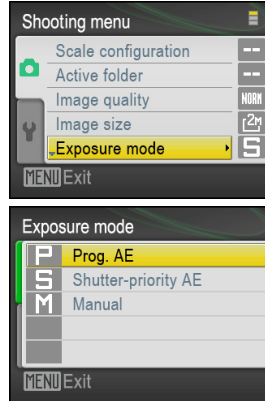


5.5 Selecting the Exposure Mode

Set the exposure mode used for observation or capturing.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.
- 2 Select [Exposure mode], and then press the [OK] (or right) button.
The [Exposure mode] screen appears.
- 3 Select one of the following three exposure modes:
 - **Prog. AE (initial setting)**
The P-400R automatically sets both the shutter speed and the camera gain.
 - **Shutter-priority AE**
The P-400R automatically sets the camera gain in accordance with the shutter speed set by the user.
 - **Manual**
The user manually sets both the shutter speed and the camera gain.
- 4 Press the [OK] (or right) button to apply the selection.

The [Shooting menu] screen appears again.



✓ Overexposure and underexposure indications

If the exposure mode is Program AE or Shutter-priority AE, depending on the brightness of the object, the correct exposure might not be obtained. In such a case, an exposure alarm is displayed on the bottom of the [Shooting menu] screen.

Note: Images can be captured even though an exposure alarm is displayed.

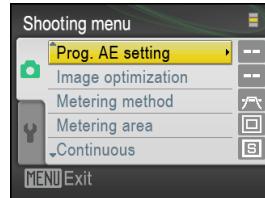
- **Program AE:**
If the object is overexposed, "P-OVER" is displayed and if underexposed, "P-UNDER" is displayed.
Adjust the illumination and brightness of the object as needed in order to obtain the correct exposure.
- **Shutter-priority AE:**
If the object is overexposed, "S-OVER" is displayed and if underexposed, "S-UNDER" is displayed.
Adjust the illumination and shutter speed as needed in order to obtain the correct exposure.

5.6 Program AE Settings

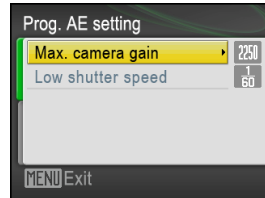
Set the upper limit on the camera gain and the lower limit on the shutter speed in Program AE mode.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.

- 2 Select [Prog. AE setting], and then press the [OK] (or right) button.
The [Prog. AE setting] screen appears.



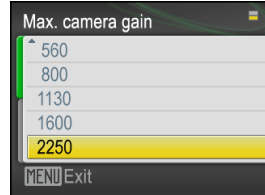
- 3 Select [Max. camera gain], and then press the [OK] (or right) button.
The [Max. camera gain] screen appears.



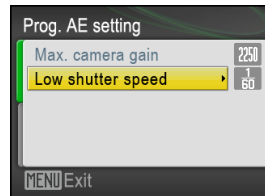
- 4 Select the maximum camera gain value, and then press the [OK] (or right) button to apply the selection.

- Maximum camera gain (initial value: 2250)
100 to 2250 (10 levels)

The [Prog. AE setting] screen appears again.



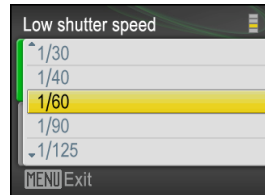
- 5 Select [Low shutter speed], and then press the [OK] (or right) button.
The [Low shutter speed] screen appears.



- 6 Select the lower limit on the shutter speed, and then press the [OK] (or right) button to apply the selection.

- Lower limit on the shutter speed (initial value: 1/60)
1/250 to 1 (17 levels)

The [Prog. AE setting] screen appears again.

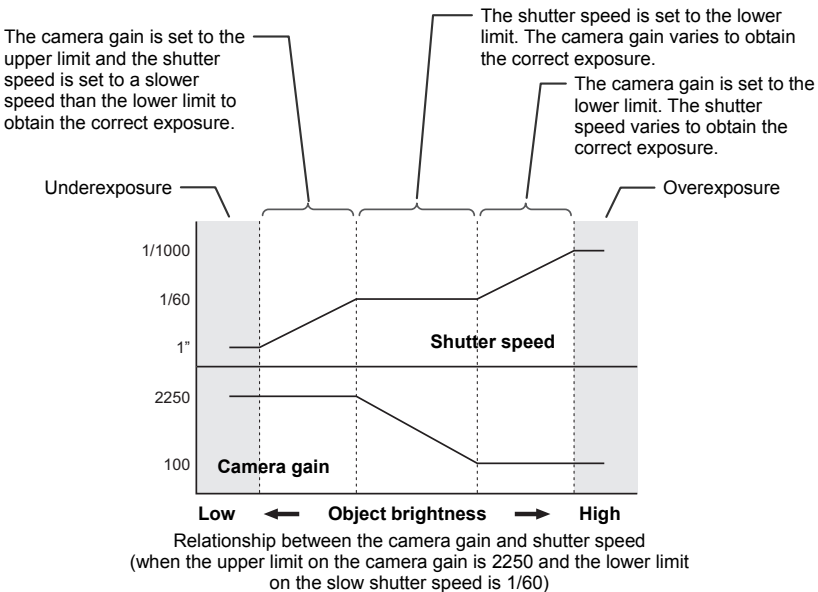


✔ Program AE settings

In Program AE mode, the upper limit on the camera gain and the lower limit on the slow shutter speed can be set. By specifying these settings, the user can determine the balance between prevention of vibration due to a slow shutter speed and avoidance of image quality degradation (increase of image noise) due to a high camera gain.

If prevention of vibration is more important, set the lower limit on the slow shutter speed to a fast speed (1/60 sec. or faster), and set the upper limit on the camera gain to the maximum. These settings avoid using a slow shutter speed if at all possible.

If avoidance of image quality degradation is more important, set the lower limit on the slow shutter speed to a slower speed to minimize increase of the camera gain. Note that if the upper limit on the camera gain is set low, the range in which the correct exposure is obtained is narrow if the brightness of the object is low.



Exposure control in Program AE mode

If the brightness of the object is high, the P-400R first decreases the camera gain to maintain the image quality, and then increases the shutter speed to obtain the correct exposure.

If the brightness of the object is low, the P-400R sets the shutter speed to the lower limit, and adjusts the camera gain to obtain the correct exposure. If the object is underexposed even when the camera gain is set to the upper limit, a shutter speed slower than the lower limit is used. The camera gain never exceeds the upper limit.

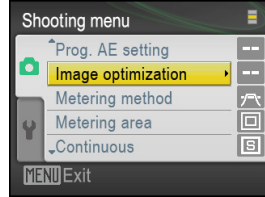
5.7 Setting the Quality of Images to be Captured

Set the quality of images to be captured on a fine-grained basis.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.

- 2 Select [Image optimization], and then press the [OK] (or right) button.

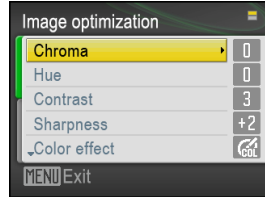
The [Image optimization] screen, that lists the items that can be adjusted, appears.



- 3 Select the desired item, and then press the [OK] (or right) button.

The items that can be adjusted from the [Image optimization] screen are listed below. When one of these items is selected and then the [OK] (or right) button is pressed, the setting menu for the selected item is displayed.

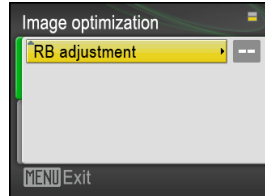
- Chroma
- Hue
- Contrast
- Sharpness
- Color effect
- RB adjustment



Page 1

- 4 Set the value of each item using the multi-selector.

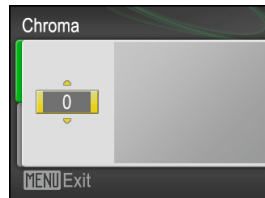
The value to be set can be adjusted by viewing the live image.



Page 2

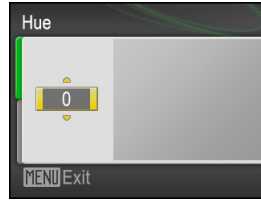
- **Chroma**

A value from -20 to +20 can be set. The value can be incremented or decremented by 1. The initial value is 0.



- **Hue**

A value from -50 to +50 can be set. The value can be incremented or decremented by 1. The initial value is 0.



- **Contrast**

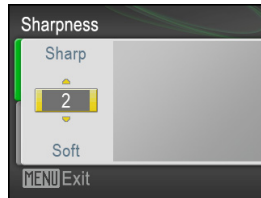
One of the following seven preset contrast settings can be selected.

- 1: Wide D-range
- 2: Weak contrast
- 3: Standard contrast (initial setting)
- 4: Strong contrast
- 5: Linear
- 6: Contrast for metal
- 7: Enhanced contrast



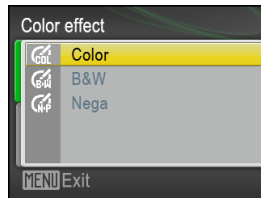
- **Sharpness (edge emphasized)**

-3 (soft) to 5 (sharp)
(Initial value: 2)



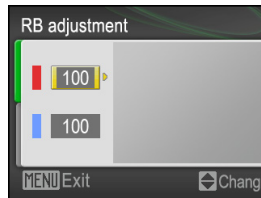
- **Color effect**

- Color (initial setting)
- B&W
- Nega



- **RB adjustment**

The tint can be adjusted by changing the R (red) and B (blue) values. Each value can be changed in the range from 50 to 150 on the assumption that the status existing when the white balance is acquired is 100. The value can be incremented or decremented by 2. The initial value is 100.



5 Press the [OK] (or right) button to apply the settings.

The [Image optimization] screen appears again.

✔ **Contrast setting**

The following seven preset items are provided for the contrast setting. Select the preferable setting depending on the object.

- **1: Wide D-range**

Use this for the high-luminance object observation that requires the gradation setting from dark to bright.

- **2: Weak contrast**

Use this to lower the contrast.

- **3: Standard contrast (initial setting)**

Use this for the normal capturing.

- **4: Strong contrast**

Use this to increase the contrast so that the image is clear.

- **5: Linear**

Use this to obtain linear output especially when examining the difference of the light amount with the capture data.

- **6: Contrast for metal**

Use this to obtain a high contrast image while reducing the unevenness at the bright area.

- **7. Enhanced contrast**

Use this when observing an object while enhancing the contrast.

5.8 Switching the Metering Method

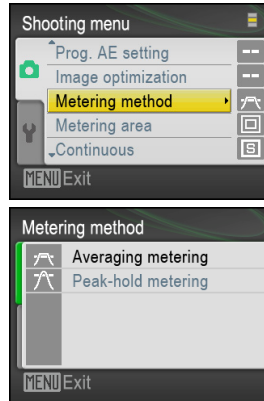
Set the metering method used for observation and capturing.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.

- 2 Select [Metering method], and then press the [OK] (or right) button.
The [Metering method] screen appears.

- 3 Select either of the following two metering methods:
 - **Averaging metering (initial setting)**
The exposure is adjusted so that the average exposure value in the metering area and the preset value match.
 - **Peak-hold metering**
The exposure is adjusted so that the highest (peak) exposure value and the preset value match.

- 4 Press the [OK] (or right) button to apply the selection.
The [Shooting menu] screen appears again.



5.9 Switching the Metering Area

Set the size of the metering area.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.

- 2 Select [Metering area], and then press the [OK] (or right) button.

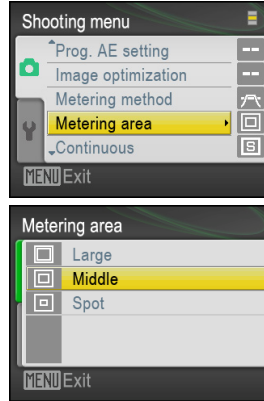
The [Metering area] screen appears.

- 3 Select one of the following three metering area sizes:

- **Large**
About 95% of the image sensor is measured.
- **Middle (initial setting)**
About 50% of the image sensor is measured.
- **Spot**
About 20% of the image sensor is measured.

- 4 Press the [OK] (or right) button to apply the selection.

The [Shooting menu] screen appears again.



✔ Position of the metering area

The center of the metering area is always fixed to the center of the image sensor.

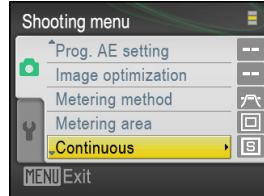
5.10 Using Continuous Shooting Mode

Specify the continuous shooting mode settings to be used during capturing.

- 1 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.

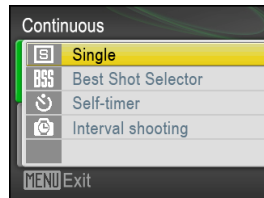
- 2 Select [Continuous], and then press the [OK] (or right) button.

The [Continuous] screen appears.



- 3 Select one of the following modes:

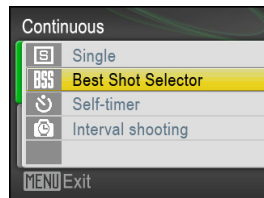
- **Single (initial setting)**
In this mode, a single image is acquired with a press of the capture switch.



- **Best Shot Selector**
In this mode, a maximum of 10 frames of images is acquired while the capture switch is pressed, and only the image whose file size is largest is saved (the capture sound is not emitted). Generally, the size of images that are not vibrated or defocused tends to be larger than vibrated or defocused images.

If this mode is selected, the BSS icon (BSS) is displayed on the LCD monitor.

* This mode can be selected only if a JPG mode is selected as the image quality mode. When TIFF is selected, only a single image is acquired like in normal capturing.)

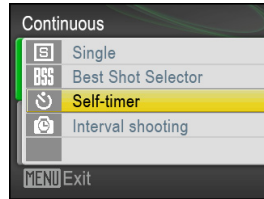


- **Self-timer**

In this mode, capturing starts two seconds after the capture switch is pressed.

When the capture switch is pressed, the counter starts counting down. When the counter value is 0, capturing is performed.

If this mode is selected, the timer icon (⌚) is displayed on the LCD monitor.



- **Interval shooting**

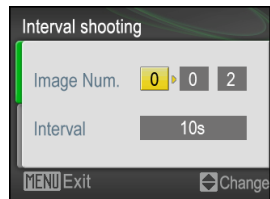
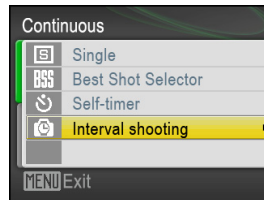
In this mode, single-shot shooting is performed at regular intervals. The number of images to be captured and the interval are specified before the shooting. This mode is useful in a case such as when the time-dependent change in the specimen should be recorded.

- **Image Num.**

Specify the number of images to be captured. A number from 2 to 999 (the maximum varies depending on the amount of free space left on the SD card) can be selected.

- **Interval**

Specify the interval at which images are to be captured. 10s, 15s, 20s, 30s, 45s, 60s, 90s, 2m, 3m, 4m, 5m, 6m, 10m, 15m, 20m, 30m, 45m, 60m, 90m, 2h, 3h, 4h, 5h, or 6h (s: seconds, m: minutes, h: hours) (initial setting: 10s) can be selected.



Pressing the capture switch starts interval shooting. The interval shooting icon (⌚) is displayed at the top left of the screen, together with the interval and the number of images.

During interval shooting, only the power switch, capture switch, monitor button, and playback buttons can be used. If any of these four buttons is pressed during interval shooting, a message asking you whether the shooting should be stopped appears.

4

Press the [OK] (or right) button to apply the selection.

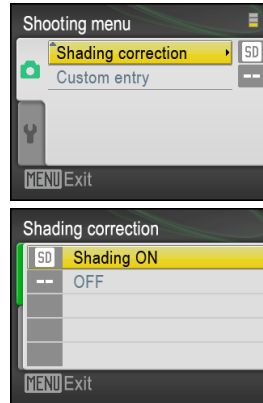
The [Shooting menu] screen appears again.

5.11 Correcting Shading

Shading correction is functionality that corrects uneven exposure that is due to, for example, limb darkening. Select whether to enable this functionality.

- 1 Select [Shading correction], and then press the [OK] (or right) button.
- 2 Select [Shading correction], and then press the [OK] (or right) button.
The [Shading correction] screen appears.
- 3 Select either of the following items to determine whether to enable shading correction:
 - **Shading ON (initial setting)**
Shading is corrected. Select this setting for normal use.
 - **OFF**
Shading is not corrected.
- 4 Press the [OK] (or right) button to apply the selection.

The [shooting menu] screen appears again.



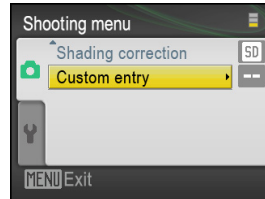
5.12 Registering a Custom Definition

The current shooting conditions can be registered as up to four kind of custom setting.

1 Set desired shooting conditions.

Set shooting conditions to be used as a set of custom settings. For details on setting shooting conditions, see “4 Basic Operations for Capturing and Playing Back” and “5 Advanced Use of Capturing Functions.”

2 In shooting mode, press the [MENU] button to display the [Shooting menu] screen.



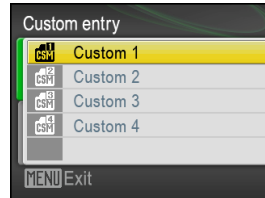
3 Select [Custom entry], and then press the [OK] (or right) button.

The [Custom entry] screen appears.

4 Select the number of the custom setting to be created, and then press the [OK] (or right) button.

The current shooting conditions are saved as a custom setting.

The [Shooting menu] screen appears again.



✓ Shooting conditions that can be registered as custom settings

- Exposure mode (Program AE, Shutter-priority AE, or Manual)
- Shutter speed (when Shutter-priority AE or Manual is selected)
- Camera gain (when Manual is selected)
- Exposure compensation (when Program AE or Shutter-priority AE is selected)
- Metering method (when Program AE or Shutter-priority AE is selected)
- Metering area (when Program AE or Shutter-priority AE is selected)
- White balance setting
- Image quality adjustment settings
- Illumination area
- Brightness
- Shading correction

✓ Registering the 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).

6

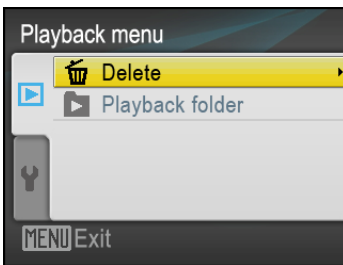
Advanced Use of Playback Functions

Using the playback menu

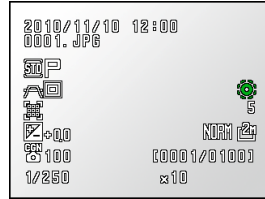
The playback menu can be used to delete multiple images at one time and specify the settings for playing back images.

Displaying the playback menu

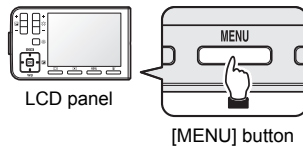
In playback mode, pressing the [MENU] button displays the [Playback menu] screen on the LCD monitor. The playback menu is displayed on this screen.



[Playback menu] screen



Playback mode



LCD panel

[MENU] button

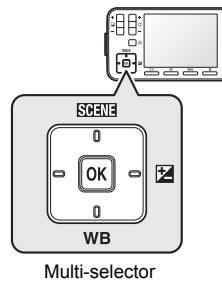
6

Using the playback menu

The playback menu is operated by using the multi-selector on the LCD panel.

Select the item using the top and bottom buttons of the multi-selector, and then press the right (or [OK]) button to apply the selection.

Pressing the left button redispays the upper-level menu item.



Multi-selector

Restarting playback mode

If the [MENU] or playback button is pressed when the playback menu is displayed, the P-400R is placed in playback mode again, and a saved image is displayed on the LCD monitor.

Operations that can be performed using the playback menu

Table: Operations that can be performed using the playback menu

Section	Item	Description	Page
6.1	Deleting Multiple Images All at One Time	The images selected by using their thumbnail images or a folder containing images can be deleted.	71
6.2	Specifying the Playback Folder	The folder containing the images to be displayed when a playback operation is performed is specified.	74

6.1 Deleting Multiple Images All at One Time

Multiple images can be deleted all at one time by using the playback menu.

! Notes on deleting images

- Once images are deleted, they can no longer be restored. Take a special care not to delete necessary images inadvertently. We recommend that you transfer and save necessary images to a PC or storage media.
- Image files on the SD card can be made read-only by accessing them from a PC. Read-only image files cannot be deleted by using the P-400R. If the images or folder selected for deletion include read-only files, a warning message appears when deletion is attempted.

6.1.1 Deleting the selected images

Select images and delete them all at one time.

1 In playback mode, press the [MENU] button to display the [Playback menu] screen.

2 Select [Delete], and then press the [OK] (or right) button.

The [Delete] screen appears.

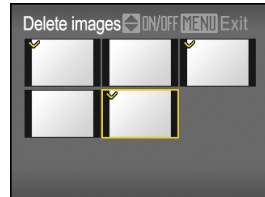
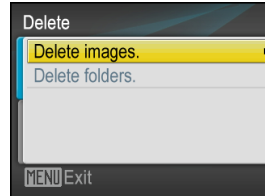
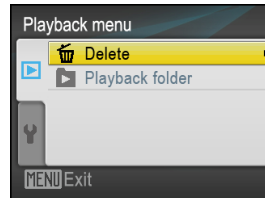
3 Select [Delete images], and then press the [OK] (or right) button.

The [Delete images] screen appears, and the thumbnail images for the images saved in the active folder are displayed.

4 Position the selection frame at an image to be deleted using the right and left buttons of the multi-selector, and then determine whether to delete the image using the top and bottom buttons.

For the selected images, a check mark is indicated.

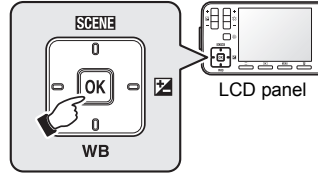
Multiple images can be selected for deletion.



Use the right and left buttons to select an image, and use the top or bottom button to determine whether to delete the image.

5 Press the [OK] button.

A message requesting confirmation to delete the image appears.



[OK] button

6 To delete the images, select [Yes], and then press the [OK] button. To cancel deletion, select [No], and then press the [OK] button.

When deletion is completed, a confirmation message appears for two seconds.

The [Playback menu] screen appears again.



✓ If the SD card is write-protected

If the SD card is write-protected when deletion is attempted, a confirmation message appears.

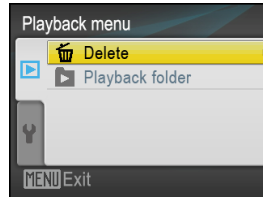
6

Advanced Use of Playback Functions

6.1.2 Deleting a folder containing images

Select a folder that contains images on the SD card, and delete the folder and the images contained in the folder.

1 In playback mode, press the [MENU] button to display the [Playback menu] screen.

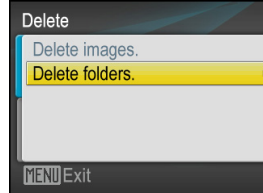


2 Select [Delete], and then press the [OK] (or right) button.

The [Deletion] screen appears.

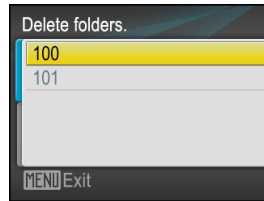
3 Select [Delete folders], and then press the [OK] (or right) button.

The [Delete folders] screen appears. This screen lists the three-digit numbers of the subfolders in the DCIM folder on the SD card.



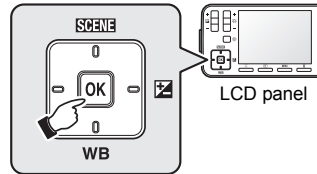
- 4 Select the folder to be deleted using the top and bottom buttons of the multi-selector.**

More than one folder cannot be selected.



- 5 Press the [OK] button.**

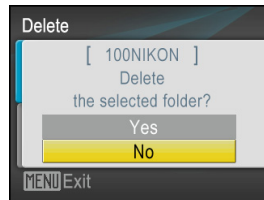
A message requesting confirmation to delete the folder appears.



[OK] button

- 6 To delete the folder, select [Yes], and then press the [OK] button. To cancel deletion, select [No], and then press the [OK] button.**

When deletion is completed, a confirmation message appears for two seconds. The [Playback menu] screen appears again.



✓ Notes on folder deletion

- If the SD card is write-protected, a confirmation message appears.
- The active folder or the folder specified as the playback folder cannot be deleted. If the active folder or playback folder is selected for deletion, a confirmation message appears.
- If a read-only image is included in the folder to be deleted, images other than that are deleted and the read-only image and the folder remain. In this case, a confirmation message appears after the deletion.

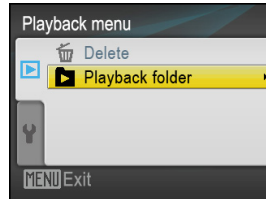
6.2 Specifying the Playback Folder

Select a playback folder. The images contained in the playback folder are played back when a playback operation is started.

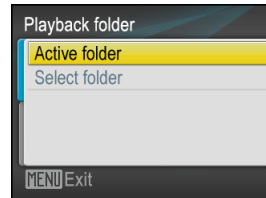
Normally, the active folder is specified as the playback folder. Any folder can be temporarily selected as the playback folder. The procedure is shown as follows.

When the playback mode is terminated, the setting of the playback folder is reset and the active folder is specified as the playback folder.

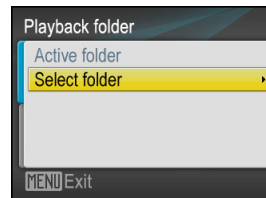
- 1 In playback mode, press the [MENU] button to display the [Playback menu] screen.
- 2 Select [Playback folder], and then press the [OK] (or right) button.
The [Playback folder] screen appears.



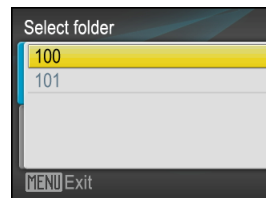
- 3 Select either of the following menu items:
 - **Active folder (initial setting)**
The folder currently used as the active folder is selected as the playback folder.
 - **Select folder**
Select this menu item to specify a specific folder in the DCIM folder as the playback folder.



- 4 Press the [OK] (or right) button.
If [Select folder] is selected, a list of folders is displayed.



- 5 If [Select folder] is selected, select the folder to be used as the playback folder using the top and bottom buttons of the multi-selector, and then press the [OK] (or right) button to apply the selection.
The [Playback menu] screen appears again.



✔ Settings of the playback folder

The selection of the playback folder is reset. When the P-400R is turned on the next time, the active folder set as the default is used as the playback folder.

7

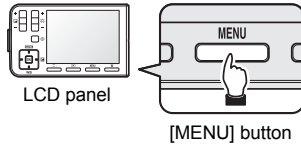
Changing Settings

Using the setup menu

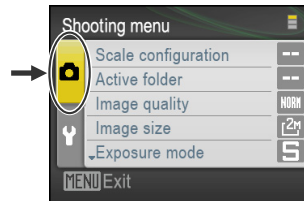
The setup menu is used to specify the overall P-400R settings.

Displaying the setup menu

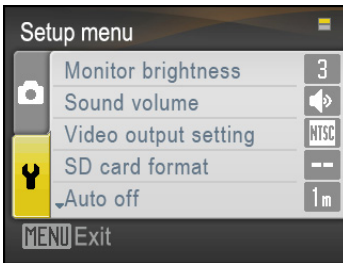
- 1 Press the [MENU] button to display the [Shooting menu] or [Playback menu] screen.



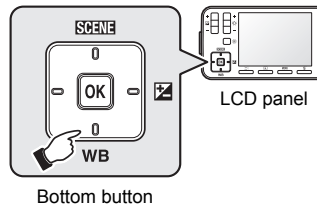
- 2 Press the left button of the multi-selector to select the tab of [Shooting menu] (📷) or [Playback menu] (▶). Then, press the bottom button to select the tab of [Setup menu] (🔧).



Select the tab



[Setup menu] screen



7

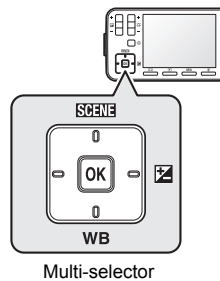
Changing Settings

Using the setup menu

The setup menu is operated by using the multi-selector on the LCD panel.

Select the item using the top and bottom buttons of the multi-selector, and then press the right (or [OK]) button to apply the selection.

Pressing the left button redisplay the upper-level menu item.



Restarting shooting/playback mode

From the setup menu, to place the P-400R in playback mode again, press the capture switch. To place it in playback mode again, press the playback button (▶). Pressing the [MENU] button places the P-400R in the previous mode again.

Operations that can be performed using the setup menu

The following table describes the operations that can be performed by using the setup menu.

Table: Operations that can be performed using the setup menu

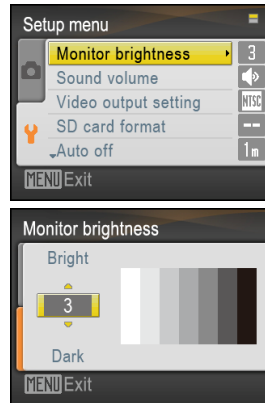
Section	Item	Description	Page
7.1	Adjusting the Brightness of the LCD Monitor	The brightness of the LCD monitor can be selected from five levels. The brightness can be adjusted by checking the gray scale.	77
7.2	Adjusting the Volume of the Operation Sound	The volume of the sound emitted when the P-400R is turned on or an operation is performed can be selected from Loud, Normal, Soft, and OFF.	77
7.3	Selecting the Video Output Signal Format	The format of video output signal can be selected from NTSC, PAL, and OFF.	78
7.4	Initializing an SD Card	The SD card inserted in the P-400R can be initialized.	78
7.5	Setting the Automatic Power Save Function	The P-400R can automatically enter standby mode if no operation is performed for a length of time. The time can be specified from the setup menu.	79
7.6	Selecting the Language	The language of the text displayed on the LCD monitor can be selected from English and Japanese.	79
7.7	Setting the Current Date and Time	The current date and time can be set.	80
7.8	Setting the Vibration Alarm Display	Whether to show/hide the vibration alarm	81
7.9	Checking the Version Information	The version information of the P-400R firmware can be displayed.	81
7.10	Restoring the Initial Settings	The P-400R settings can be initialized to the factory default settings.	82

7.1 Adjusting the Brightness of the LCD Monitor

Adjust the brightness of the LCD monitor.

- 1 **Display the [Setup menu] screen.**
- 2 **Select [Monitor brightness], and then press the [OK] (or right) button.**
The [Monitor brightness] screen appears.
- 3 **Select the brightness level (1 to 5) of the LCD monitor using the top and bottom buttons of the multi-selector.**
 - 1 (darkest) to 5 (brightest)
(initial setting: 3)

Determine the level, checking the display of the chart.
- 4 **Press the [OK] (or right) button to apply the selected brightness level.**
The [setup menu] screen appears again.

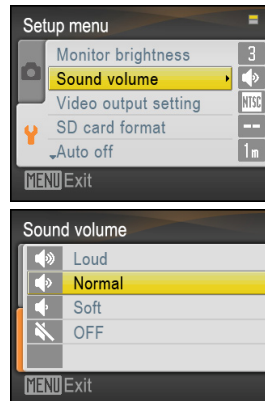


7.2 Adjusting the Volume of the Operation Sound

Adjust the volume of the startup, operation, and capture sounds.

- 1 **Display the [Setup menu] screen.**
- 2 **Select [Sound volume], and then press the [OK] (or right) button.**
The [Sound volume] screen appears.
- 3 **Select the volume level using the top and bottom buttons of the multi-selector.**
 - Loud, Normal, Soft, OFF
(initial setting: Normal)

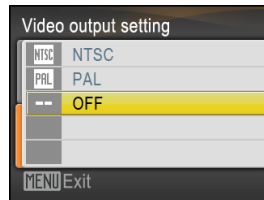
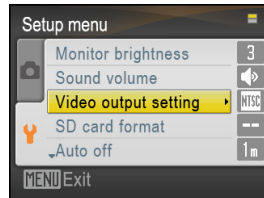
Sounds will be emitted at the selected volume level.
- 4 **Press the [OK] (or right) button to apply the selected volume level.**
The [Setup menu] screen appears again.



7.3 Selecting the Video Output Signal Format

Select the format of video output signal.

- 1 **Display the [Setup menu] screen.**
- 2 **Select [Video output setting], and then press the [OK] (or right) button.**
The [Video output setting] screen appears.
- 3 **Select the format of video output signal using the top and bottom buttons of the multi-selector.**
 - NTSC, PAL, OFF (initial setting: OFF)
- 4 **Press the [OK] (or right) button to apply the selection.**
The [Setup menu] screen appears again.



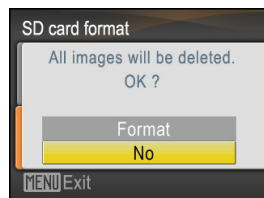
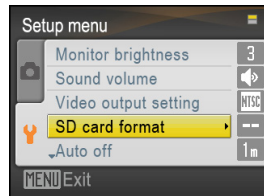
7

Changing Settings

7.4 Initializing an SD Card

Use the P-400R to initialize the SD card inserted in the P-400R.

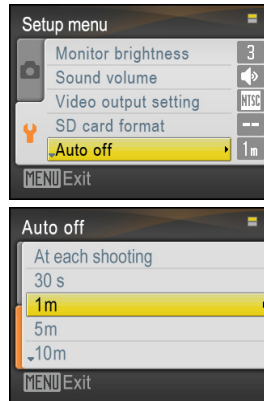
- 1 **Display the [Setup menu] screen.**
- 2 **Select [SD card format], and then press the [OK] (or right) button.**
The [SD card format] screen appears, and then a confirmation message appears.
- 3 **Select [Format] or [No] using the top and bottom buttons of the multi-selector, and then press the [OK] (or right) button.**
If [Format] is selected, the SD card is initialized, and a folder named 100NIKON is created in the DCIM folder.
The [Setup menu] screen appears again.



7.5 Setting the Automatic Power Save Function

Enable this function and specify the time until the P-400 enters standby mode.

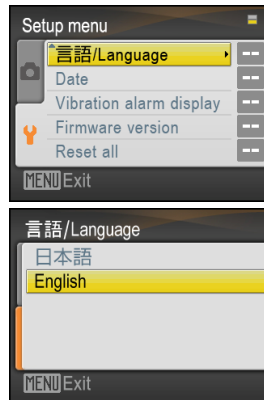
- 1 Display the [Setup menu] screen.
- 2 Select [Auto off], and then press the [OK] (or right) button.
The [Auto off] screen appears.
- 3 Set the no-operation time period after which the P-400R is placed in standby mode using the top and bottom buttons of the multi-selector.
 - At each capturing, 30s, 1m, 5m, 10m, 20m (initial setting: 1m)
(s: seconds, m: minutes)
- 4 Press the [OK] (or right) button to apply the selection.
The [Setup menu] screen appears again.



7.6 Selecting the Language

Select the language of the text displayed on the LCD monitor.

- 1 Display the [Setup menu] screen.
- 2 Select [Language], and then press the [OK] (or right) button.
The [Language] screen appears.
- 3 Select the language to be used using the top and bottom buttons of the multi-selector.
 - Japanese/English
- 4 Press the [OK] (or right) button to apply the selection.
The [Setup menu] screen appears again.



7.7 Setting the Current Date and Time

Set the current date and time.

- 1 Display the [Setup menu] screen.
- 2 Select [Date], and then press the [OK] (or right) button.

The [Date] screen appears.

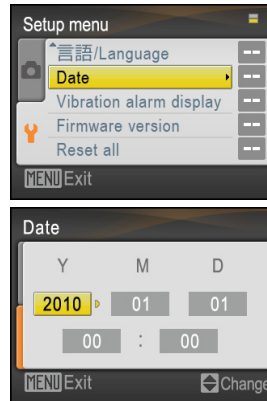
- 3 Set the date (YYYY/MM/DD) and time (hh:mm).

Select each of the year, month, day, hour, and minute fields using the right and left buttons of the multi-selector, and change the value of each field using the top and bottom buttons so that the current date and time are displayed.

- **Range of time that can be set**
2009/1/1 00:00 to 2048/12/31 23:59

- 4 Press the [OK] (or right) button to apply the date and time settings.

The [Setup menu] screen appears again.



✓ Date and time setting in the P-400R

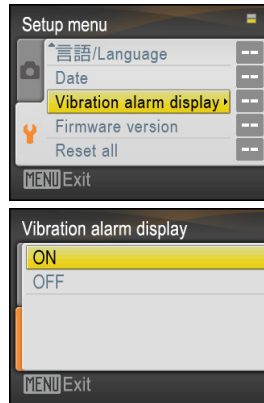
When the power to the P-MFSC Motorized Focusing Stand Controller with the P-400R attached is turned on, the date and time setting in the P-400R changes according to the date and time setting in the motorized stand.

In addition, when the date and time is set in the motorized stand, the date and time setting in the P-400R is changed accordingly.

7.8 Setting the Vibration Alarm Display

Enable or disable the vibration alarm display.

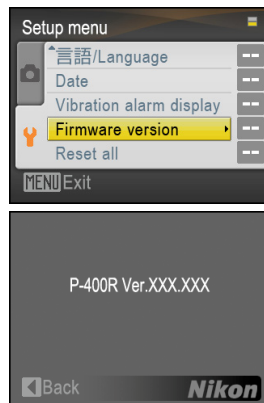
- 1 Display the [Setup menu] screen.
- 2 Select [Vibration alarm display], and then press the [OK] (or right) button.
The [Vibration alarm setting] screen appears.
- 3 Select [ON] or [OFF] to enable or disable the vibration alarm display using the top and bottom buttons of the multi-selector.
 - ON/OFF (initial setting: ON)
- 4 Press the [OK] (or right) button to apply the selection.
The [Setup menu] screen appears again.



7.9 Checking the Version Information

Check the version information of the P-400R firmware.

- 1 Display the [Setup menu] screen.
- 2 Select [Firmware version], and then press the [OK] (or right) button.
The version number of the P-400R firmware is displayed.
- 3 Press the [OK] (or left) button to redisplay the [Setup menu] screen.



7.10 Restoring the Initial Settings

Restore the P-400R initial settings.

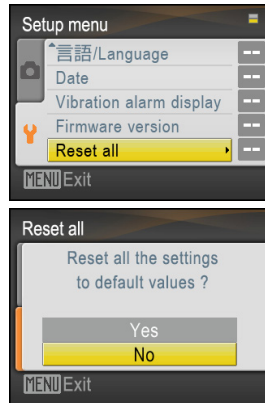
- 1 Display the [Setup menu] screen.
- 2 Select [Reset all], and then press the [OK] (or right) button.

A confirmation message appears.

- 3 Select [Yes] or [No] using the top and bottom buttons of the multi-selector, and then press the [OK] (or right) button.

If [Yes] is selected, the P-400R settings are initialized to the factory settings.

The [Setup menu] screen appears again.



✓ Settings to be initialized

The following settings will be initialized:

- Settings that can be specified from the shooting menu (excluding active folder selection)
- Settings that can be specified from the playback menu
- Settings that can be specified from the setup menu
- Scene mode settings
- White balance settings
- Exposure compensation

8

Connecting to a PC

If the optional USB cable (P-CUS USB cable) is used to connect the P-400R to a PC, the images saved in the P-400R can be transferred to the PC.

- 1 Turn off the P-400R.**
- 2 Start up a PC.**
- 3 Use the optional USB cable (P-CUS) to connect the P-400R to the PC.**
- 4 Turn on the P-400R.**

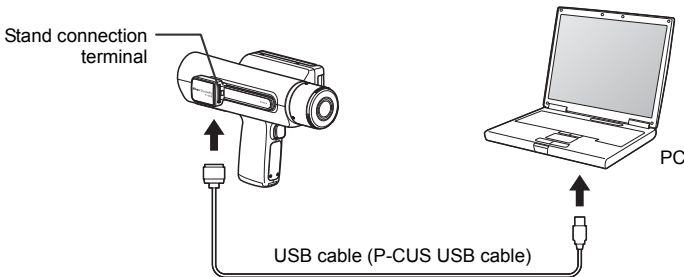
The indicator in the power switch lights up. When the P-400R is turned on, the PC recognizes the connected P-400R.

- 5 Transfer image files to a PC using the ShuttlePix Editor.**

For details on the operational procedure for the ShuttlePix Editor, see the ShuttlePix Editor instructions.

- 6 After transfer is completed, turn off the P-400R, and disconnect it from the PC.**

Be sure to turn off the P-400R before disconnecting the USB cable.



❗ Notes on connecting the USB cable

- When connecting the USB cable, make sure to plug the connectors at both ends of the cable correctly, without putting excessive pressure on the connectors.
- Do not use a USB hub when connecting the P-400R to a PC.

✔ P-400R behavior during USB connection

When the P-400R is connected to a PC, the P-400R LCD monitor turns off, and the P-400R does not accept any operations other than turning on or off the power switch.

✔ P-400R power when connecting to a PC

When the P-400R is connected to a PC, use a well-charged battery or an optional AC adapter so that the power is not running out during operation.

8.1 ShuttlePix Editor

ShuttlePix Editor is a free application program provided by Nikon.

✓ ShuttlePix Editor operating environment

The ShuttlePix Editor can be used in the following environments. For details on installing the ShuttlePix Editor, see the ShuttlePix Editor documentation.

- Windows 7
- Windows XP Service Pack 3

Note: The quick view function can be used only on Windows 7.

Note: The operating environment might change without prior notice. For more information, see the ShuttlePix Editor documentation.

Using the ShuttlePix Editor

Using the ShuttlePix Editor, images can be imported from a ShuttlePix series digital microscope, and the imported images can be viewed, simply measured, and edited.

For details on using ShuttlePix Editor, see the ShuttlePix Editor documentation.

8

Connecting to a PC

8.2 Quick View

When the ShuttlePix Editor is started on a PC that is connected to the P-400R using a P-CUS USB cable, a high-definition image captured in the P-400R can be displayed on the ShuttlePix Editor screen in real time (quick view function).

Set the quick view function in the ShuttlePix Editor. See the instruction manual for ShuttlePix Editor for details.

✓ Using the P-400R when the quick view function is enabled

The P-400R can be used normally except for some functions when the quick view function is enabled in the ShuttlePix Editor.

✓ Quick view functional environment

The quick view function in the ShuttlePix Editor can be used only on Windows 7. It cannot be used on Windows XP.

9

Troubleshooting

Incorrect use might prevent this product from providing primary performance even though the product 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 corrected by taking action as described in the table, remove the battery or disconnect the power cord of the product, and then contact your nearest Nikon representative.

9.1

Power Supply and Battery

Symptom	Possible cause	Action	Page
The power does not come on.	No battery is inserted.	Insert a battery.	8
		Connect an optional AC adapter.	16
	The battery charge level is low.	Use a battery charger to charge the battery.	6
		Connect an optional AC adapter.	16
	The battery performance is degraded temporarily because the temperature is low.	Connect an optional AC adapter.	16
	The AC adapter is not connected correctly.	Connect the AC adapter cable and power cord correctly.	16
The power is turned off.	The battery charge level is low.	Use a battery charger to charge the battery.	6
		Connect an optional AC adapter.	16
	Auto power save function works.	If no button is pressed for a predetermined period, this product enters the standby status automatically. In this status, after three minutes have passed, the power automatically turns off (except for during interval shooting). Change the auto power save setting or turn on the power again.	22 79
The battery cannot be charged.	The battery is not inserted correctly.	Insert the battery to the battery charger in the correct orientation.	6
	The power cord of the battery charger is not connected.	Connect the power cord correctly.	6
	An attempt is made to charge the battery via the AC adapter connected to the P-400R.	A battery cannot be charged when it is connected to the P-400R. Remove it from the P-400R and insert it to the battery charger to charge it.	6 16

9.2 Image Display

Symptom	Possible cause	Action	Page
No image is displayed on the LCD monitor.	A lens cover is attached.	Remove the lens cover and direct the lens to the object.	26
	The illuminator is turned off.	Turn on the illuminator so that the object is illuminated adequately.	28
	Light amount is not sufficient.	Adjust the illuminator to adequate intensity.	29
	The exposure setting is not adequate.	Adjust the exposure so that an image with proper brightness can be displayed.	32 36
	An external monitor is connected.	Disconnect the P-CV Video Cable from the P-400R. Operate the power switch of the motorized focusing stand.	15
	The P-400R is attached to the motorized focusing stand.	When the P-400R is mounted on the motorized focusing stand, the LCD monitor of the P-400R is turned off.	See the ShuttlePix Digital Microscope Instructions.
	P-RELS Release is connected to the P-400R.	Turn off the video output signal when the P-RELS Release is connected, or disconnect it.	42 78
	No SD card is inserted.	Insert an SD card.	11
No image is displayed on the external monitor.	The cable is not connected correctly.	Use the optional P-CV Video Cable to connect the P-400R to the external monitor.	15
	The power to the external monitor is off.	Turn on the power to the external monitor.	15
	The input of the external monitor is not switched correctly.	Switch to the external input.	15
	The video output signal format is different.	Set the P-400R video output signal format appropriate for the external monitor to be used. NTSC or PAL can be selected as the video output signal format.	78

9.3 Working with This Product

Symptom	Possible cause	Action	Page
Capturing is not possible.	No SD card is inserted.	Insert an SD card.	11
	The P-400R is attached to the motorized focusing stand.	When the power to the motorized focusing stand, on which the P-400R is mounted, is turned on, the capture switch of the P-400R cannot be used. Operate the capture switch of the motorized focusing stand.	See the ShuttlePix Digital Microscope Instructions.
Operation with the LCD panel is not possible.	A confirmation or warning message is displayed in the LCD monitor.	When a confirmation or warning message is displayed, only specific operations can be accepted. After checking the message, use the multi-selector and the [OK] button to use the LCD panel.	90
	Interval shooting is being performed.	During interval shooting, requests for operations other than those permitted cannot be accepted.	42 65
The best-shot selector does not function correctly.	TIFF is set for the image quality mode.	The best-shot selector functions only when JPG is selected. When TIFF is selected, normal capturing is performed.	42 55 65

9.4 View of Microscopic Images

Symptom	Possible cause	Action	Page
An image blurs.	The object is not in focus.	The focus position of this product is 29 mm off the end of the lens. Focus on the specimen by adjusting the distance between the specimen and the P-400R while checking the focus indicator displayed on the LCD monitor.	26
		Use the contact observation adapter for capturing.	27
	Vibration has occurred.	Illuminate the object so that the shutter speed is faster than 1/60.	28 32 37 57
		Use the best-shot selector function.	42 65
		Use a tripod.	26
		Use the optional P-RELS Release switch.	42 81
	The shutter speed is too slow.	If using a slow shutter speed when capturing an object that is moving, the object blurs. Switch the exposure mode to Shutter-priority AE or Manual, and set a faster shutter speed.	28 37 57

Symptom	Possible cause	Action	Page
The image is too dark or too bright.	The illumination is not set properly.	Adjust the illumination area and illumination brightness correctly.	28
		Adjust the ambient light properly.	—
	The exposure is not adequate.	If the exposure mode is Program AE, perform exposure compensation. Alternatively, set the metering area and method properly.	36 63 64
		If the exposure mode is Shutter-priority AE, set a proper shutter speed or perform exposure compensation. Alternatively, set the metering area and method properly.	36 37 63 64
		If the exposure mode is Manual, set a proper shutter speed and camera gain. Alternatively, set the metering area and method properly.	37 38 63 64
	The image quality is not adjusted properly.	Properly specify the chroma, hue, contrast, sharpness, and other settings.	60
	The brightness of the LCD monitor is not proper.	Adjust the brightness properly.	77
The contrast is low.	The illumination is too bright or too dark.	Adjust the brightness of the illumination properly.	28
		Adjust the exposure.	36
	The image quality is not adjusted properly.	Properly specify the chroma, hue, contrast, sharpness, and other settings.	60
	The brightness of the LCD monitor is not proper.	Adjust the brightness properly.	77
Color reproducibility is not good.	The white balance is not set properly.	Obtain the while balance under the same conditions as for the observation and capturing.	40
	The illumination is too bright or too dark.	Adjust the brightness of the illumination properly.	28
		Adjust the exposure.	36
	The image quality is not adjusted properly.	Properly specify the chroma, hue, contrast, sharpness, and other settings.	60
	The brightness of the LCD monitor is not proper.	Adjust the brightness properly.	77
The image quality is rough.	The camera gain is set too high.	The higher the camera gain is, the noisier the captured image becomes. Ensure that the object is illuminated properly, and capture images with a proper camera gain and shutter speed.	28 36

9.5 Image Saving

Symptom	Possible cause	Action	Page
Data cannot be written to the SD card or read from the SD card.	The SD card has not been inserted correctly.	Insert the SD card correctly.	12
	The SD card has not been initialized.	Initializing the SD card.	13 78
	The SD card is locked.	Release the lock.	14
	The inserted SD card is not supported by this product.	Use an SD card supported by this product. miniSD and microSD cannot be used.	11
	The operational checks have not been performed for the inserted SD card.	Use an SD card for which the operational checks have been performed.	11
	The free space remaining on the SD card is insufficient.	Replace the SD card with the one on which sufficient free space remains.	12
		Delete saved images to increase the amount of available space.	46 71
		Initialize the SD card.	78
	The settings of the save folder and the reproduction folder are incorrect.	In this product, save and playback folders can be set separately. Make sure that the desired folders have been set correctly.	53 74

9.6 System Operation

Symptom	Possible cause	Action	Page
Date or time is incorrect.	No battery has been inserted for two days or more.	When using this product after it has not been used for a long time, set the date and time again. The internal clock of this product is not as accurate as general clocks. We recommend that you adjust the date and time periodically.	80
The product is hot when touched.	The ambient temperature is high. Alternatively, this product is used in a small room.	If this product is used for a long time, the temperature of the product increases. Especially, if the temperature of the environment in which the product is used is high, the temperature of the product also tends to increase easily. Use the product in a usage environment described in "11 Major Specifications."	98
	A hardware failure has occurred.	If you notice unusual smell such as burned odor, immediately stop using the product, and then ask your nearest Nikon representative for repair.	—

9.7 Warning Messages

This section explains the meaning of the alert messages displayed on the LCD monitor and the actions to take to solve the problem.

SD card related

Message	Meaning	Action	Page
No SD card	The SD card has not been inserted or not recognized correctly.	Insert the SD card correctly.	12
SD card is locked.	An attempt was made to capture or delete an image when the locked SD card was inserted.	Release the lock of the SD card.	14
SD card has problem.	An abnormality of the access to the SD card was detected.	Replace the SD card.	11
SD card error	Non-supporting SD card was inserted.	Use a supporting SD card.	11
SD card is not formatted. Format SD card?	There is no DCIM folder on the SD card, or no "xxxNIKON" (xxx represents a 3 digit-number.) in the DCIM folder.	Initialize the SD card or replace it with another SD card.	12 13
No more images can be saved.	The number of the files in the SD card has reached 9999.	The maximum number of the files that can be stored in the SD card is 9999. Delete unnecessary images from the SD card or replace the SD card.	12 46 71
No more folders can be saved.	The number of the folders in the SD card has reached 900.	The maximum number of the folders that can be stored in the SD card is 900. Delete unnecessary folders from the SD card or replace the SD card.	12 72
Out of memory	There is not enough space left in the SD card.	Delete unnecessary images in the SD card or replace the SD card with another one.	12 46 71

Image observation/capturing

Message	Meaning	Action	Page
Image cannot be saved.	An error occurred during image recording and the image could not be stored.	Access to the SD card is possible, but image recording has failed. Replace the SD card with another one or initialize the SD card and try again.	12 78
White Balance failed.	White balance could not be obtained.	Prepare a white object, make adjustment so that the object fills within the metering area, and try again.	40
Do you stop to image at interval?	Button operation was performed during interval shooting.	To stop interval shooting, select [Yes], and to continue, select [No].	42 65
A folder already exists.	When creating a folder, a name that has already been used for an existing folder was specified.	Create a folder with another name.	53
Select active folder.	The folder set as an active folder that was used the last time disappeared.	Select an active folder or create a new folder.	53
LED 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 fixed to 10 in Hi-reflection sample mode. Adjust the exposure by compensating the exposure or changing the shutter speed or camera gain.	32 36 37 38

Image playback/deletion

Message	Meaning	Action	Page
No image	There is no captured image in the specified folder in the SD card.	The image was not in the playback or shooting folder at the time of image playback or deletion.	–
This file cannot be played back.	The image that cannot be played back in this product has specified in playback mode.	The data created by a PC, etc. cannot be played back in this product.	–
Image(s) cannot be deleted.	An attempt was made to delete a protected image.	The image that has been set as “Read-only” in a PC cannot be deleted. Change the attribute of the image in the PC before deleting the image.	46
Protected images cannot be deleted.	The image specified as an exception of the deletion or the image in a protected folder is included.	The image that has been set as “Read-only” in a PC cannot be deleted. Change the attribute of the image in the PC before deleting the image.	71
Play-back folder cannot be deleted.	An attempt was made to delete the folder specified as the playback folder.	The folder that has been specified as the playback folder cannot be deleted. Set another folder to the playback folder and try again.	72 74
Active folder cannot be deleted.	An attempt was made to delete the folder specified as the active folder.	The folder that has been specified as the active folder cannot be deleted. Set another folder to the playback folder and try again.	53 72

Battery/System

Message	Meaning	Action	Page
Battery exhausted.	The battery has run out.	After this message appears, the power is automatically turned off. Charge the battery or replace it with a charged one.	6 23
Battery is at high temperature.	The temperature of the battery has exceeded 60°C.	After this message appears, the power is automatically turned off. If this message appears during the normal use, a failure is concerned. Ask your nearest Nikon representative to repair it.	—
System error	An error has occurred in the internal circuit of the camera.	After this message appears, the power is automatically turned off. If this message appears during the normal use, a failure is concerned. Ask your nearest Nikon representative for repair.	—
	The battery voltage is higher than the normal voltage.	After this message appears, the power is automatically turned off. Replace the battery with a proper one. If this message appears during the normal use, a failure is concerned. Ask your nearest Nikon representative to repair it.	—
	The temperature of the usage environment is low and the battery temperature has become -10°C or less.	After this message, the power is automatically turned off. Use it under the proper environment.	—
Transfer error	A cable has been removed during communication with a PC.	Turn off the power to the P-400R before plugging in or unplugging the cable.	83
For quick view, this function is locked.	The P-400R is operated when the quick view function is being used on a PC.	Do not play back or delete an image, initialize an SD card or use the auto power save related functions during the quick view.	84

10 Daily Maintenance

To prolong the performance of this product, it is recommended to perform daily maintenance as described below.

10.1 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)

10.2 Cleaning the Lenses

Do not let stains, such as dust or a 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 become 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.

10.3 Cleaning the LCD Panel

- If the LCD panel is dirty, wipe it gently with a soft clean cotton cloth, a lens tissue, or gauze.
- Only if the lens become 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.

10.4 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.

10.5 Storage

- Store this product 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.

10.6 Periodic Inspections (Charged)

Periodic inspections are recommended in order to maintain the performance of this product. Consult your Nikon representative for details about periodic inspections.

11 Major Specifications

For details on the specifications of the following products, see the instruction manual for each product:

- P-Li01 P-Li-ion Rechargeable Battery
- P-CH01 P-BACH Battery Charger

11.1 P-400R Digital Microscope

System

Model name	P-400R Digital Microscope
------------	---------------------------

Imaging optics

Working distance	29 mm off the tip of the objective
Magnification	0.44x to 8.8x (zoom ratio = 1:20)
Zooming	Motorized zoom
Zoom magnification	16 levels (1x, 1.2x, 1.5x, 1.8x, 2.0x, 2.5x, 3.0x, 4.0x, 5.0x, 6.0x, 8.0x, 10.0x, 12.0x, 15.5x, 18.0x, 20.0x)
NA	Up to 0.2
Aperture	2 levels Resolution-priority mode / DOF-priority mode

Imager

Image sensor	1/1.8-in square-pixel CCD
Number of pixels	Total number of pixels: 1688 x 1248 (approx. 2.11 M) pixels Number of effective pixels: 1620 x 1220 (approx. 1.98 M) pixels Number of recording pixels: 1600 x 1200 (1.92 M) pixels or 800 x 600 (0.48 M) pixels
Frame rate	28 fps

Image capturing

Continuous shooting mode	Single / timer (2 seconds fixed) / interval / best-shot selector
Recording medium	SD card (SD2.0-compliant SDHC-compatible card with a capacity of up to 16 GB)
Image file	DCF-compliant file or EXIF 2.2-compliant file
File format	TIFF (8-bit non-compression) JPG FINE (compression rate: approx. 1/4) JPG NORMAL (compression rate: approx. 1/8) JPG BASIC (compression rate: approx. 1/16)

Image quality control

Scene mode	6 modes (Standard, Wafer/IC Chip, Metal Ceramic, Circuit Board, FPD, Hi-reflection Sample)
Custom setting	4 settings
Aperture	Resolution-priority mode / DOF-priority mode

Exposure mode	Program AE/Shutter-priority AE/Manual
Metering method	Average metering/Peak-hold metering with AE lock functionality
Metering area	Large / Middle / Spot
Exposure compensation	-2EV to +2EV in 1/3EV steps
Image quality adjustment	Chroma / hue / contrast / sharpness / color effect / RB adjustment
Shutter speed	Program AE mode: 1/1000 sec. to 1 sec. Manual/Shutter-priority AE 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 levels)
Shutter speed (in Hi-reflection sample mode)	Program AE mode: 1/20000 sec. to 1 sec. Manual/Shutter-priority AE 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 levels)
Camera gain (ISO sensitivity)	Program AE or Shutter-priority AE mode: 100 to 2250 Manual mode: 100, 140, 200, 280, 400, 560, 800, 1130, 1600, 2250 (10 levels)
White balance	Manual setting (red/blue gain can be adjusted)
Shading correction	On/Off can be switched

Image playback

Zoom	1x to 16x, magnified area can be moved
Thumbnail display	9 frames
Image deletion	File-based or folder-based

Operation system

Operating sound	Loud, medium, soft or off
Auto power save	Every one exposure / 30 sec. / 1 min. / 5 min. / 10 min. / 20 min.
Formatting	SD card can be initialized
Date and time settings	Year/month/day/hour/minute
Language setting	Japanese/English
Distance measuring functionality	Measurement scale display (image can be embedded)

Focus assist

Method	Contrast detection method
Indication	10-step focus indicator (with 0.4-sec. peak hold)
Detection area	Central 1/9 area of the displayed image

Illumination optics

Light source	Eight white LEDs
Illumination method	Ring illumination method
Illumination area	Diameter: 20 mm, four-way (top/bottom/right/left) polarized illumination possible
Illumination intensity control	Off, 10 levels (1 to 10, 10 is a maximum.) Fixed to 10 in Hi-reflection sample mode

LCD monitor

LCD panel	2.66-in. color LCD
Effective displayable area	53.97 mm x 40.5 mm
Dot configuration	960 x 240 pixels, RGB delta arrangement
Swivel mechanism	The monitor can be rotated horizontally 0° to 180° (with stops at 0°, 90°, and 180°), and vertically -90° to +90°.
On/off control	The monitor is turned off automatically when the microscope is mounted on a motorized focusing stand or an external monitor is connected.
Brightness adjustment	Five levels

Connector for the stand

Stand connection terminal	For connection with the P-MFSC Motorized Focusing Stand Controller or the P-CUS USB Cable (only either of these)
Video signal output/release switch connection terminal	For connection with the P-CV Video Cable or the P-RELS Release Video signal output: component video signal, 75 ohm (NTSC/PAL)
DC power input terminal	For connection with the AC adapter Input rating: 12 VDC, 1.5 A

Power supply

Battery	One P-Li01 P-Li-ion Rechargeable Battery
AC adapter	Dedicated AC adapter (optional, model name: EA1050E-120)

Other specifications

External dimensions	228.3 x 141.8 x 96.4 mm
Mass	1 kg (excluding the battery and SD card)
Tripod socket hole	1/4-inch, 1/P=20 camera tripod socket screw
Usage environment	Temperature: 0 to +40°C Humidity: 60% RH Max. (no condensation) Altitude: 2000 m Max. Pollution degree: Degree 2 Installation: Category II Electrical shock protection class: Class III, indoor use only
Storage environment	Temperature: -20 to +60°C Humidity: 90% RH Max. (no condensation)

Applied Standards	<p>This product complies with FCC Part 15B Class A.</p> <p>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.</p> <p>These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.</p> <p>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.</p> <p>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>This product complies with Canadian EMI regulations. (ICES-003 Class A)</p> <p>This Class A digital apparatus complies with Canadian ICES-003(A) / NMB-003(A).</p> <p>Cet appareil numérique de classe A est conforme à la norme NMB-003(A) du Canada.</p> <p>This product complies with Australian AS/NZS CISPR11.</p> <p>CE marking</p> <ul style="list-style-type: none">- This product satisfies the EU LV (low voltage) directive.- This product satisfies the EU EMC directive. (EN61326-1: 2006)
-------------------	---



11.2 AC Adapter

Model name	EA1050E-120
Manufacturer	EDAC POWER Electronics Co., Ltd.
Rated input voltage	100-240 VAC, 50/60 Hz, 1.8 A, max.
Rated output voltage	12 VDC, 3.5 A Max.
Power cord	<p>For regions where the power supply is 100 to 120 VAC: Use a UL-listed detachable power cord set. (3 conductor grounding Type SVT, NO.18 AWG, 3m long maximum, rated at 125 VAC minimum)</p> <p>For regions where the power supply is 220 to 240 VAC: Use only an EU/EN-approved three-conductor power cord set. (3 conductor grounding Type H05VV-F, 3m long maximum, rated at 250 VAC minimum)</p> <p>For use in Japan: Use only a detachable cord set with a PSE mark, 3 conductor type. (3 conductor grounding Type VCTF 3x0.75mm², 3m long maximum, rated at 125 VAC minimum.)</p>
External dimensions (width x depth x height)	60 x 35 x 120 mm
Mass	253 g (excluding the power cord)
Usage environment	Temperature: 0 to +40°C Humidity: 90% RH Max. (no condensation)
Storage environment	Temperature: -20 to +85°C Humidity: 90% RH Max. (no condensation)
Safety standards	UL-approved, GS-approved, CE-compatible, and PSE-compatible product

11.3 P-RELS Release

Model name	P-RELS Release
External dimensions (width x height x depth)	23 x 12.4 x 83 mm (excluding the cable)
Connector	L type, 3.5-mm diameter stereo mini plug
Cable length	1 m ±50 mm
Usage environment	Temperature: 0 to +40°C Humidity: 60% RH Max. (no condensation)
Storage environment	Temperature: -20 to +60°C Humidity: 90% RH Max. (no condensation)


11.4**Supported Standards**

- **DCF (Design rule for Camera File system):**
This recording system allows image files recorded by digital cameras from different manufacturers to be used mutually.
- **Exif (Exchangeable image file format) Version 2.2:**
The goal of this standard is to enhance the linkage between digital cameras and printers to easily obtain high-quality print output. With a printer that complies with this standard, optimal print results are achieved using the information on the image when it is captured. For details, refer to the instruction manual for the printer.

En Symbol for separate collection applicable in European countries

This symbol indicates that this product is to be collected separately. The following apply only to users in European countries.

- This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste.
- For more information, contact the retailer or the local authorities in charge of waste management.



No Symbol for kildesortering i europeiske land

Dette symbolet indikerer at produktet skal kildesorteres. De nedenstående punkterne gælder for alle europæiske brugere.


- Dette produktet skal kildesorteres og indleveres til dedikerede innsamlingspunkter. Må ikke kastes med normalt husholdningsaffald.
- For mer informasjon, ta kontakt med din forhandler eller lokale myndigheter.



De Symbol für getrennte Wertstoff-/Schadstoffsammlung in europäischen Ländern

Dieses Symbol zeigt an, dass dieses Produkt separat entsorgt werden muss. Folgendes gilt für Verbraucher in europäischen Ländern:


- Dieses Produkt darf nur separat an einer geeigneten Sammelstelle entsorgt werden. Eine Entsorgung im Hausmüll ist unzulässig.
- Wenden Sie sich für nähere Informationen bitte an Ihren Händler oder die örtlich für Abfallentsorgung zuständigen Behörden.



Se Symbol för separat upphämtning i europeiska länder

Den här symbolen anger att produkten måste hämtas separat. Följande gäller bara användare i europeiska länder.


- Den här produkten är avsedd för separat upphämtning vid ett lämpligt uppsamlingsställe. Produkten får inte kastas i hushållsaffall.
- För mer information, kontakta återförsäljaren eller de lokala myndigheter som ansvarar för avfallsantering.



Fr Symbole pour la collecte sélective applicable aux pays européens

Ce symbole indique que ce produit doit être collecté séparément. Les mesures suivantes concernent uniquement les utilisateurs européens.

- Ce produit doit être jeté séparément dans un point de collecte approprié. Ne jetez pas ce produit dans une poubelle réservée aux ordures ménagères.
- Pour plus d'information, contactez le détaillant ou les autorités locales responsables de la gestion des ordures.



Fi Erillisen keräyksen merkki Euroopan maissa

Tämä merkki osoittaa, että tuote kerätään erikseen. Seuraavat maininnat koskevat vain eurooppalaisia käyttäjiä.


- Tämä tuote kerätään erikseen asianmukaista keräyspisteistä. Älä hävitätä tuotetta talousjätteen mukana.
- Lisätietoja saat jälleennäyttältä tai paikallisista jätteenhuoltoviranomaisilta.



Es Simbolo para recogida separada aplicable en países Europeos

Este símbolo indica que este producto se recogerá por separado. Lo siguiente sólo se aplicará en países Europeos.


- Este producto ha sido designado para su recogida en un punto de almacenamiento apropiado. No lo tire como un desecho doméstico.
- Para más información, contacte con el vendedor o autoridades locales al cargo de la gestión de residuos.



Ru Символ сортировки мусора, использующийся в европейских странах

Данный символ означает, что этот продукт должен утилизироваться отдельно от других.


- Приведенная ниже информация касается только пользователей из стран Европы.
- Данный продукт должен утилизироваться отдельно от других в соответствующих приемных пунктах. Не выбрасывайте данный продукт вместе с бытовым мусором.
- Дополнительную информацию Вы можете получить у продавца или у местных властей, отвечающих за утилизацию мусора.



Dk Symbol for special bortskaffelse af denne type produkter i de europæiske lande

Dette symbol angiver, at dette produkt skal bortskaffes specielt. Det efterfølgende er kun til brugere i de europæiske lande.


- Dette produkt skal bortskaffes på fx en genbrugsplads el. lign. Det må ikke smides væk som normalt husholdningsaffald.
- For yderligere information kontakt din forhandler eller de lokale myndigheder, som fx teknisk forvaltning.



Gr Σύμβολο για την ξεχωριστή αποκομιδή απορριμμάτων στις Ευρωπαϊκές χώρες

Αυτό το σύμβολο υποδηλώνει ότι η αποκομιδή αυτού του προϊόντος πρέπει να γίνει ξεχωριστά.


- Τα κάτωθι απευθύνονται μόνο σε Ευρωπαϊκούς χρήστες.
- Αυτό το προϊόν είναι σχεδιασμένο έτσι ώστε να γίνεται η αποκομιδή του σε ειδικά όπια. Μην το πετάτε μαζί με τα υπόλοιπα απορρίμματα.
- Για περισσότερες πληροφορίες, επικοινωνήστε με τον διανομέα του προϊόντος ή με τις υπεύθυνες τοπικές αρχές για θέματα διαχείρισης απορριμμάτων.



Nl Symbol voor gescheiden inzameling zoals dat wordt gebruikt in Europese landen

Dit symbool betekent dat dit product apart moet worden ingezameld. Het volgende is alleen van toepassing op gebruikers in Europa.


- Dit product dient gescheiden ingezameld te worden op een daartoe bestemd inzamelpunt. Niet wegwerpen bij het normale huishuif.
- Neem voor meer informatie contact op met het verkooppunt, of met de lokale instantie die verantwoordelijk is voor het verwerken van afval.



Pl Symbol oznaczający segregowanie odpadów, stosowany w krajach Europy

Ten symbol oznacza, że produkt musi być wyrzucony oddzielnie. Ponizsze uwagi mają zastosowanie tylko dla użytkowników z Europy.


- Ten produkt jest przeznaczony do oddzielnej utylizacji i powinien być dostarczony do odpowiedniego punktu zbierającego odpady. Nie należy go wyrzucać z odpadami gospodarstwa domowego.
- Aby uzyskać więcej informacji, należy skontaktować się z przedstawicielem przedsiębiorstwa lub lokalnymi władzami odpowiedzialnymi za zarządzanie odpadami.



Pt Simbolo para recolha de resíduos em separado utilizado nos países Europeus

Este símbolo indica que este produto é para ser recolhido separadamente. Esta norma aplica-se só para os utilizadores nos países Europeus.


- Este produto está designado para recolha de resíduos em separado num recipiente apropriado. Não deitar no caixote do lixo doméstico.
- Para mais informações, contactar o revendedor ou as autoridades locais responsáveis pela gestão dos resíduos.



Hu Európai országokban érvényes "Elkülönített hulladékgyűjtés" jelzése

Ez a jelzés azt jelenti, hogy ezt a terméket elkülönítve kell gyűjteni. Az alábbiak csak az európai országokban élő felhasználókra érvényes.


- Ezt a terméket a megjelölt hulladékgyűjtőhelyen, elkülönítve kell gyűjteni. Ne dobja ki háztartási hulladékként.
- További információkért forduljon a forgalmazáshoz, vagy a helyi hatóság hulladékgyűjtésként felelős részlegéhez.



It Simbolo per la raccolta differenziata applicabile nei paesi europei

Questo simbolo indica che il prodotto va smaltito separatamente. La normativa che segue si applica soltanto agli utenti dei paesi europei.


- Il prodotto è designato per lo smaltimento separato negli appositi punti di raccolta. Non gettare insieme ai rifiuti domestici.
- Per maggiori informazioni, consultare il rivenditore o gli enti locali incaricati della gestione dei rifiuti.



Cz Symbol pro oddělení sběr odpadu platný v evropských zemích

Tento symbol znamená, že tento produkt se má odkládat odděleně. Následující pokyny platí pro uživatele z evropských zemí.


- Tento produkt se má odkládat na místě sběru k tomuto účelu určeném. Neadhazujte spolu s domácím odpadem.
- Více informací o způsobu zacházení s nebezpečným odpadem vám podá příslušná místní instituce.



jp ヨーロッパにおける廃棄物個別回収のシンボルマーク

このシンボルマークは本製品が個別に回収されなければならないことを示しています。

- 本製品は本製品がヨーロッパ (EU) で使用する場合にのみ適用されます。
- 本製品は指定された収集場所で個別に回収されるように定められています。家庭ごととして廃棄しないでください。
- 詳細については販売代理店または地域の廃棄物処理機関にご連絡ください。




This symbol is provided for use in the People's Republic of China, for environmental protection in the fields of electronic information products.

このマークは、中国のお客様に向けたもので、電子情報製品分野における環境保護を目的としています。

住所 / ADDRESS

産業機器 / Industrial Instruments

株式会社ニコン
〒100-8331
東京都千代田区有楽町 1-12-1 新有楽町ビル
インストルメンツカンパニー 産業機器マーケティング部 営業課
電話: (03)3216-2384
インストルメンツカンパニー 産業機器マーケティング部 販売促進課
電話: (03)3216-2371

株式会社ニコンインステック
本 社
〒100-0006
東京都千代田区有楽町 1-12-1(新有楽町ビル 4F)
電話: (03)3216-9171 (産業機器)

名古屋営業所
〒465-0093
名古屋市中東区一社 3-86(クレストビル 2F)
電話: (052)709-6851 (バイオサイエンス・産業機器)

関西支店
〒532-0003
大阪市淀川区宮原 3-3-31(上村ニッセイビル 16F)
電話: (06)6394-8802 (産業機器)

九州支店
〒913-0034
福岡市東区多の津 1-4-1
電話: (092)611-1111 (バイオサイエンス・産業機器)

NIKON INSTRUMENTS INC.
1300 Walt Whitman Road, Melville, N.Y. 11747-3064, U.S.A.
tel. +1-631-547-8500

NIKON INSTRUMENTS EUROPE B.V.
Tripolis 100, Burgerweeshuispad 101, 1076 ER Amsterdam,
The Netherlands
tel. +31-20-7099-000

NIKON INSTRUMENTS(SHANGHAI)CO.,LTD.
tel. +86-21-6841-2050

NIKON SINGAPORE PTE LTD
tel. +65-6559-3618

NIKON MALAYSIA SDN BHD
tel. +60-3-7809-3688

NIKON INSTRUMENTS KOREA CO.,LTD.
tel. +82-2-2186-8410

NIKON INDIA PRIVATE LIMITED
tel. +91-124-4688500

NIKON CANADA INC.
tel. +1-905 602 9676

NIKON FRANCE S.A.S.
tel. +33-1-4516-45-16

NIKON GMBH
tel. +49-211-941-42-20

NIKON INSTRUMENTS S.p.A.
tel. +39-55-3009601

NIKON AG
tel. +41-43 277-28-67

NIKON UK LTD.
tel. +44-208-247-1717

NIKON GMBH AUSTRIA
tel. +43-1-972-6111-00

NIKON BELUX
tel. +32-2-705-56-65

NIKON METROLOGY, INC.
12701 Grand River Avenue, Brighton, MI 48116 U.S.A.
tel. +1-810-220-4360
sales_us@nikonmetrology.com

NIKON METROLOGY EUROPE NV
Geldemaaksebaan 329, 3001 Leuven, Belgium
tel. +32-16-74-01-00
sales_europe@nikonmetrology.com

NIKON METROLOGY GMBH
tel. +49-6023-91733-0
sales_germany@nikonmetrology.com

NIKON METROLOGY SARL
tel. +33-1-60-86-09-76
sales_france@nikonmetrology.com

NIKON METROLOGY UK LTD.
tel. +44-1332-811-349
sales_uk@nikonmetrology.com

バイオサイエンス / Bioscience

株式会社ニコン
〒100-8331
東京都千代田区有楽町 1-12-1 新有楽町ビル
インストルメンツカンパニー バイオサイエンスマーケティング部 営業課
電話: (03)3216-2375
インストルメンツカンパニー バイオサイエンスマーケティング部 販売促進課
電話: (03)3216-2360

株式会社ニコンインステック
本 社
〒100-0006
東京都千代田区有楽町 1-12-1(新有楽町ビル 4F)
電話: (03)3216-9163 (バイオサイエンス)

札幌営業所
〒060-0051
札幌市中央区南 1 条東 2-8-2(SRビル 8F)
電話: (011)281-2535 (バイオサイエンス)

仙台営業所
〒980-0014
仙台市青葉区本町 1-1-1(三井生命仙台本町ビル 19F)
電話: (022)263-5855 (バイオサイエンス)

名古屋営業所
〒465-0093
名古屋市中東区一社 3-86(クレストビル 2F)
電話: (052)709-6851 (バイオサイエンス・産業機器)

関西支店
〒532-0003
大阪市淀川区宮原 3-3-31(上村ニッセイビル 16F)
電話: (06)6394-8801 (バイオサイエンス)

九州支店
〒913-0034
福岡市東区多の津 1-4-1
電話: (092)611-1111 (バイオサイエンス・産業機器)

NIKON INSTRUMENTS INC.
1300 Walt Whitman Road, Melville, N.Y. 11747-3064, U.S.A.
tel. +1-631-547-8500

NIKON INSTRUMENTS EUROPE B.V.
Tripolis 100, Burgerweeshuispad 101, 1076 ER Amsterdam,
The Netherlands
tel. +31-20-7099-000

NIKON INSTRUMENTS(SHANGHAI)CO.,LTD.
tel. +86-21-6841-2050

NIKON SINGAPORE PTE LTD
tel. +65-6559-3618

NIKON MALAYSIA SDN BHD
tel. +60-3-7809-3688

NIKON INSTRUMENTS KOREA CO.,LTD.
tel. +82-2-2186-8410

NIKON INDIA PRIVATE LIMITED
tel. +91-124-4688500

NIKON CANADA INC.
tel. +1-905 602 9676

NIKON FRANCE S.A.S.
tel. +33-1-4516-45-16

NIKON GMBH
tel. +49-211-941-42-20

NIKON INSTRUMENTS S.p.A.
tel. +39-55-3009601

NIKON AG
tel. +41-43 277-28-67

NIKON UK LTD.
tel. +44-208-247-1717

NIKON GMBH AUSTRIA
tel. +43-1-972-6111-00

NIKON BELUX
tel. +32-2-705-56-65

M999 2012.08.08



M999JE04