FOR VETERINARY

Hand-Held Slit Lamp

KOWA SL-19 plus

INSTRUCTION MANUAL

KOWA SL-19

Kowa

Introduction

Congratulations on your purchase of the KOWA SL-19 (Camera Model).
This manual provides a description of the operating procedures and important precautions to be observed during its use.
Please read this manual carefully to ensure that the instrument can perform to its full capabilities and work safely. After you have finished reading, keep this manual in an easily accessible location for future reference.

Safety Precautions

This manual describes important precautions to be observed when you use the instrument to ensure that the instrument is used safely without causing any damage to the human body or property of the purchaser and other persons.
The following designations and pictorial symbols should be fully comprehended before reading the manual.

Meanings of Designations

⚠	**Warning**	Improper operation may result in serious injury*1 or death.
⚠	**Caution**	Improper operation may result in bodily injury*2 or property damage*3.

*1 Serious injury means vision loss, an injury, high- or low-temperature burn, electrical shock, fracture, or poisoning that causes a subsequent complication or requires hospitalization or long-term outpatient treatment.
*2 Bodily injury means an injury, burn, electrical shock and so forth that will not necessitate hospitalization or long-term outpatient treatment.
*3 Damage to property means extensive damage to a house and/or household goods as well as a domestic animal and pet.

Meanings of Symbols

△	Graphical indication of any warning and caution. What is warned is explicitly and pictorially indicated by a picture or its associated message on or near a pictorial symbol.
⃠	Graphical indication of prohibited operation (prohibitive item). What is prohibited is explicitly and pictorially indicated by a picture or its associated message on or near a pictorial symbol.
●	Graphical indication of any mandatory action (obligatory item). What must always be done is explicitly and pictorially indicated by a picture or its associated message on or near a pictorial symbol.

Disclaimer

KOWA is not responsible for:
- Any damage caused by fire, earthquake, third party action, abuse or use under abnormal conditions, or any accident caused by a user's intentional or unintentional error.
- Any incidental damage resulting from use of the product or its malfunction (e.g. loss of operating profit, business disruption, change/loss of stored data and so forth).
- Any damage resulting from disregarding what is described in this manual.
- Any damage resulting from malfunctioning caused by a combination of connected devices.

⚠ Warning

Prohibitory	Do not place a container or cup containing liquid near the instrument. Spilled liquid entering into the instrument may cause electrical shock. If liquid should be spilled into the instrument, contact KOWA or an authorized KOWA dealer for inspection.
	Do not touch the battery box with a wet hand. Otherwise, it may cause electrical shock.
	Do not short-circuit the terminals of the instrument or battery box. Otherwise, it may cause fire or electrical shock.
	Do not disassemble, modify or repair the instrument by yourself. Otherwise, fire, electrical shock, bodily injury, or instrument malfunction may occur. Refer all servicing to KOWA or authorized KOWA dealer. The instrument disassembled, modified or repaired by anyone other than a KOWA designated repair facility will void the warranty.
Obligatory	If an unusual smell, unusual noise, overheating, or smoke is generated when the slit button is turned on, turn off the slit button immediately. Continuous use may result in fire or instrument damage. Contact KOWA or authorized Kowa dealer for inspection.
	Use the designated battery box. Use of a battery box other than the designated one may cause fire or malfunction.
	Remove the batteries when they are exhausted or when the unit will not be used for a long period of time (more than three months). Leaving the battery in the unit for a long time may cause battery fluid leakage. Remove used batteries and replace them with new ones at the same time. The Ni-MH battery and its charger are not medical devices. Please contact the battery/charger manufacturer for trouble with the nickel metal hydride battery or its charger.
	Natural rubber is used inside the Filter Band. In rare cases, natural rubber may cause allergic symptoms such as itching, redness, hives, swelling, fever, dyspnea, asthma-like symptoms, decreased blood pressure, and shock. If you note any of these symptoms, stop using this instrument.

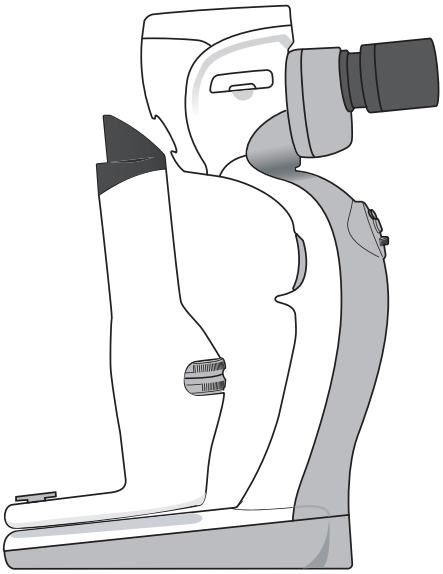
⚠ Caution

Prohibitory	Do not wipe the exterior with benzene, thinner, or ethanol. It may lead to discoloration or deterioration. If the terminals are soiled, wipe with a dry soft cloth containing.
	Do not place your hands between the revolving arm and the coupled arm. It may lead to injury if the hand is caught when the arms move.
	Do not put your fingers between the prism boxes. The hand may be caught and lead to injury when adjusting interpupillary distance.
	Do not place this instrument on an unstable surface, such as a wobbly or tilted surface. This instrument may fall and could cause injury.
	Do not use the product in humid, dusty, oily smoke, or steamy locations. Using this instrument in such environments could lead to fire or electric shock.
	Attach the battery box properly. A dropped battery box may cause damage or injury.
Obligatory	When using or carrying the instrument, hold it firmly. Dropping the instrument may lead to injury.
	Do not use this instrument in a low-temperature environment below 10°C or in a high-temperature environment above 35°C. It may cause damage to this instrument.

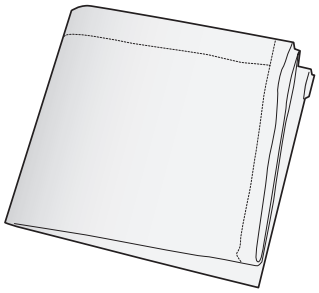
Components and Supplies

Main unit and standard items

Main unit (including battery box): 1



Dust cover: 1

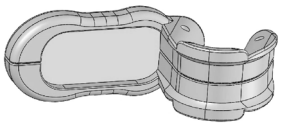


Other

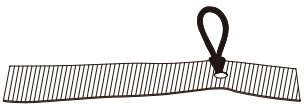
Instruction Manual: 1

Optional items

Barrier Filter B: 1

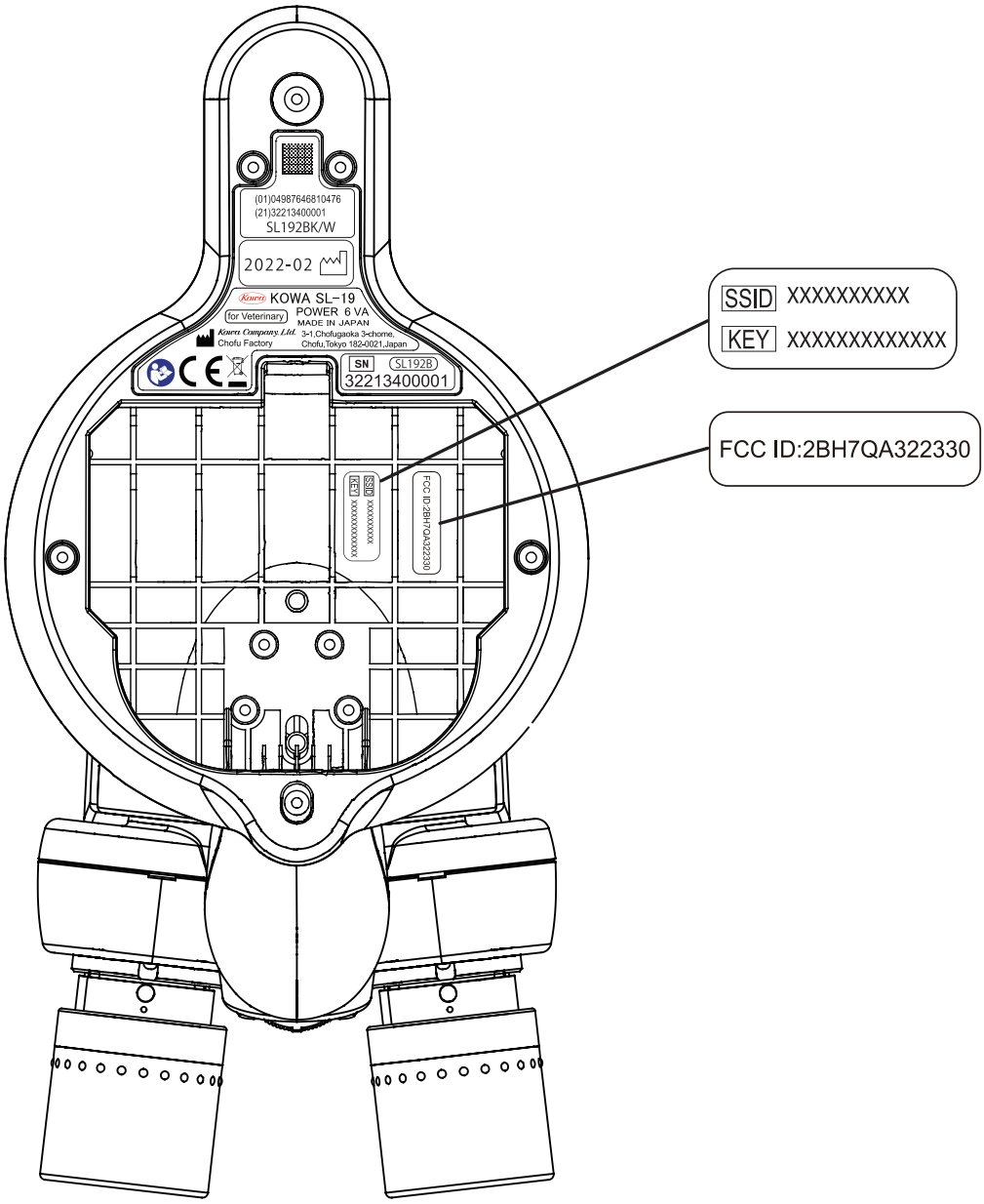


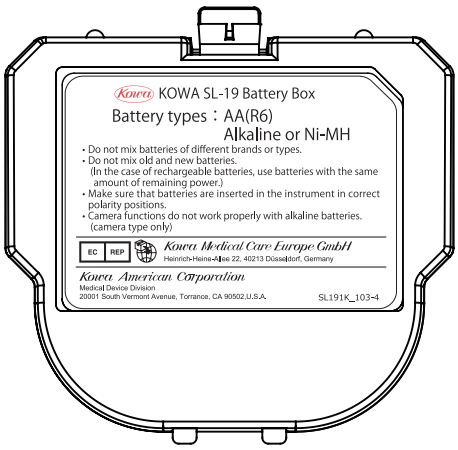
Filter Band: 1

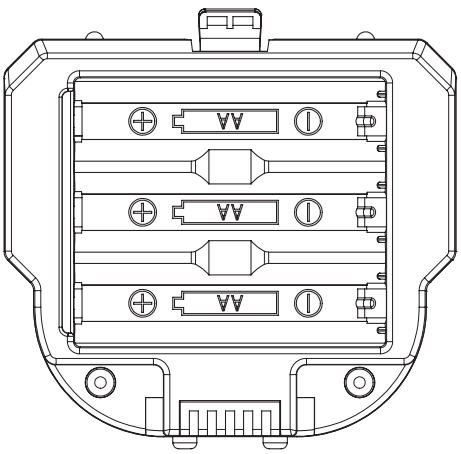


Meanings of Symbols

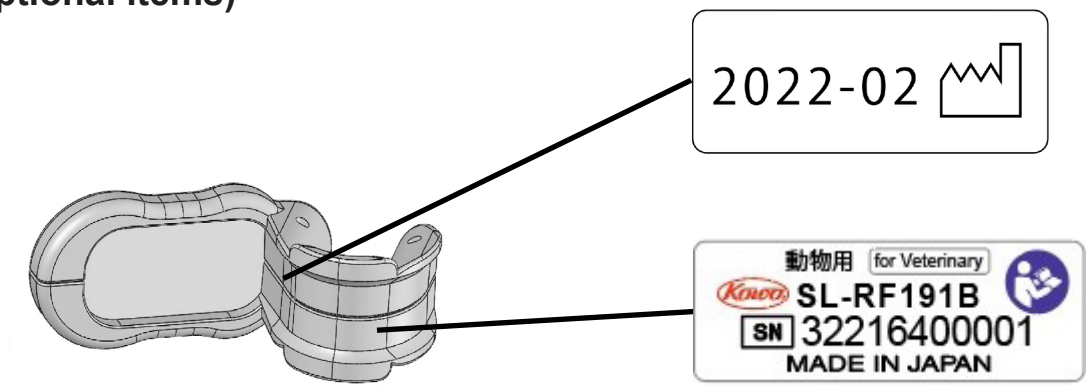
Main unit







Barrier Filter B
(optional items)



	Symbol for "Follow instructions for use"		**Symbol for "To Recycle"**
	Symbol for "DATE OF MANUFACTURE"	AA	**Indicates the size of the battery and the polarity when it is used.**
	Symbol for "MANUFACTURER"	SN	**Symbol for "Serial Number"**
EC REP	**Symbol for "Authorised Representative in the European Community"**		**Symbol for "Importer"**

For EU Market

This symbol is used only for member countries of the EU. The products with this symbol must be handled in accordance with the WEEE Directive and domestic laws of individual countries. With improper handling, harmful materials may adversely affect the environment and humans. By handling them properly, they can be reused, recycled, or reborn in another form, leading to environment conservation and effective use of resources.

Operating Precautions

1. Operating environment

1) Avoid high temperature and humidity, direct sunlight, and dust when transporting, installing and storing the instrument.
Strictly observe the following environmental conditions.

	Operational	Transport and storage
Environmental temperature	10 to 35℃	-10 to +55℃
Relative humidity	30 to 90%	10 to 95%
Atmospheric pressure	800 to 1,060 hPa	700 to 1,060 hPa

2) Avoid condensation when using, transporting or storing the instrument.

2. Precautions for maintenance and repair

1) Disinfect all parts accessible by the patient with alcohol.
2) Handle the instrument carefully and do not subject it to strong impact. Do not operate the instrument after it has been dropped or has been subjected to any other kind of strong impact.
3) When the instrument has not been used for a long period of time, inspect the items below.
   - Severe damage or deterioration of the exterior
   - Deterioration or leaking of batteries
4) Never disassemble or adjust this instrument by yourself as it involves precision parts which require special tools.
5) KOWA is not liable for malfunction and/or damages resulting from maintenance and/or repairs performed by a third party other than an agent authorized by KOWA.
6) KOWA is not liable for malfunction and/or damages resulting from maintenance and/or repairs using parts other than repair parts specified by KOWA.
7) Always cover this instrument with the dust cover when not in use.
8) Prevent running out of batteries by having new batteries prepared.

3. Disposal precautions

Disposal of this instrument, battery is subject to local laws concerning waste treatment and cleaning. When disposing, be sure to contact a licensed industrial waste disposal contractor in accordance with local government ordinances and regulations if applicable.

4. Notes on Batteries and Rechargeable Batteries

1) This instrument uses three AA batteries. Please follow the guidelines below.
   - For dry cell batteries (primary batteries), use Alkaline batteries.
   - When using a rechargeable battery, use a rechargeable nickel metal hydride battery.
   - Do not use new and old batteries together, or batteries of different brands or types together.
   - Make sure that batteries are inserted in the battery box in correct polarity positions. Batteries inserted in the wrong direction may lead to failure.
   - For dry batteries and rechargeable batteries that we recommend, please contact Kowa or your local Kowa dealer.
   - When using rechargeable batteries, always use the charger recommended by the battery manufacturer.
   - Read respective instruction manuals for precautions on batteries and chargers.
2) Always take the following precautions to avoid serious injury or fire caused by overheating, ignition, explosion, or fluid leakage.
   - If overheating occurs, immediately move away from the instrument. Leaked fluid or the instrument may catch fire and explode.
   - If battery fluid gets into the eyes, flush with clean water and see a doctor immediately.
   - If your body or clothes are contaminated with battery fluid, wash thoroughly.

⚠ Warning

Obligatory	Remove the batteries when they are exhausted or when the instrument will not be used for a long period of time (more than three months). Leaving the battery in the instrument for a long time may cause battery fluid leakage. Remove used batteries and replace them with new ones at the same time.

5. Precautions for wireless communication

1) The wireless interface of this instrument complies with IEEE802.11a/b/g/n.
   Available Channels : Ch1-11,36,40,44,48.
   Usage of this instrument is limited to indoor in the band frequency between 5150 and 5350MHz.
2) This instrument complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
   (1) This instrument may not cause harmful interference, and
   (2) this instrument must accept any interference received, including interference that may cause undesired operation.

NOTE:
This instrument has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This instrument generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this instrument does cause harmful interference to radio or television reception, which can be determined by turning the instrument off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Consult the authorized KOWA dealer or an experienced radio/TV technician for help.

3) This frequency band is used by household appliances, such as microwave ovens, industrial, scientific, and medical equipment and radio equipment used in factory manufacturing lines as well as licensed and amateur radio stations.
   Before using this instrument, check the operation status of radio stations in the surrounding area. Make sure that this instrument does not cause radio wave interference with other radio stations before starting operations.
4) Due to the influence of other devices, the communication speed and range may decrease and as a result, the communication may be disconnected.
   If there is a problem with the communication between this instrument and the computer device, please consider stopping the wireless communication of other devices.
5) In wireless communication, it is necessary to build security against eavesdropping and unauthorized intrusion into devices.
   - Kowa strongly recommends encryption and that you set a strong password.
   - Even if encryption has been done, security may be breached by malicious attacks. So please use the instrument with this understanding.
   - Always consider adding or updating other security measures, such as adding anti-virus application software to your system.
   - Kowa does not take any responsibility for the damage caused by problems that occur in situations where sufficient security has not been built.

6. Only qualified personnel should operate this instrument.

7. The following items shall be considered when installing the instrument.

1) Install at a location away from water or accidental splashing.
2) Install at a location which will not be adversely affected by atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, and air containing salt, sulfur and other substances, and the like.
3) Take care to guard against tilt, vibration, and strong impacts, for instance, during transportation.
4) The instrument must not be installed at locations where chemicals are stored or gasses are generated.
5) Check the status of the batteries (electrical discharge, polarity, etc.).

8. The following items shall be considered before using the instrument.

1) Make sure that the instrument activates properly after checking switch contact, polarity, dial setting and so forth.
2) Use of other instruments and appliances on the same power outlet is liable to cause errors and incorrect output resulting in incorrect diagnosis or hazards.
3) Before operation, make sure that the battery is sufficiently charged.

9. The following items shall be considered when using the instrument.

1) Make sure to minimize the time required for diagnosis.
2) Always ensure that the instrument and patient are in good condition.
3) When an abnormality is found on the instrument, take proper measures. For instance, stop the operation of the instrument while assuring the patient's safety.
4) Do not allow the patient to touch any part of the instrument.

10. The following items shall be considered after using the instrument.

1) The following shall be considered regarding storage location.
   (ⅰ) Store at a location away from water or accidental splashing.
   (ⅱ) Store at a location which will not be adversely affected by atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, air containing salt, sulfur and other substances, and the like.
   (ⅲ) Take care to guard against tilt, vibration, and strong impacts, for instance, during transportation.
   (ⅳ) The instrument must not be stored at locations where chemicals are stored or gasses are generated.
2) Clean and rearrange items, and the like.
3) The instrument must be cleaned after use so that there will be no problems when using it again.

11. In case of a problem or malfunction, do not attempt to repair the instrument by yourself. Appropriately label the instrument as "out of order" and contact a qualified technician for repair.

12. The instrument shall not be modified.

13. Maintenance

1) Periodically check the instrument and its components for any abnormality.
2) When using the instrument after it has not been used for a while, check beforehand to ensure that it is in normal condition and operates safely.

14. Be careful of the possibility that incorrect operation may be caused by strong electromagnetic waves.

This instrument is examined based on IEC60601-1-2.
The purpose of this standard is to keep safety against the dangerous obstacle in typical medical facilities.
In case this instrument is influenced by other instrument, or it affects other instrument or there is such fear, relocate this instrument and other apparatus or extend the distance between those instruments.

If you have any questions, please consult KOWA or an authorized KOWA dealer.

⚠ Caution For US market

Prescription device caution
Federal law restricts this device to sale by or on the order of a Physician or Practitioner.

Electromagnetic Compatibility

The following section describes the conformity to EMC and precautions for this instrument. When installing or using this instrument, read the description carefully and follow the directions described.
(The EMC of this instrument was tested based on IEC 60601-1-2.)

○ The environment for which this instrument is suitable: Home healthcare facility environment.
○ The performance in the following table is verified to determine electromagnetic compatibility (EMC) of this instrument.

Performance	• Switching ON/OFF the lamp • Output captured images

⚠ Warning

What can be anticipated if the performance is lost or degraded due to electromagnetic disturbances: The lamp is not turned on. Use of this instrument adjacent to or stacked with other instrument may lead to the improper functioning. If such use is necessary, this instrument and the other instrument should be observed to verify that they are operating normally.

⚠ Warning

This instrument has been tested for electromagnetic compatibility (EMC) in conjunction with the following items and peripheral devices. Use of non-designated items may increase the electromagnetic emission of this instrument or reduce the electromagnetic immunity, resulting in improper operation. Do not attach and use substances that are not designated.

- KOWA SL-19 charger (SL-CB191)*
- KOWA SL-19 power pack (SL-PP191)*
- AC adaptor (adapted from IEC62368) (GCF312S-0520 manufactured by GUCF)
- USB cable (not more than 1.5m) (Elecom U2C-AC15NBK)
- Computer device (Apple iPad mini (mobile digital device))

*Depending on the country / region, these may not be available.

⚠ Warning

Portable RF communications instrument (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of this instrument, including cables specified. Otherwise, degradation of the performance of this instrument could result.

<Main body and Forehead rest>

Compliance for each emissions

Emissions Test	Compliance
RF emissions CISPR 11	Group 1 Class B
Conductive emission CISPR 11	Not applicable
Harmonic distortion IEC 61000-3-2	Not applicable
Voltage fluctuations and flicker IEC 61000-3-3	Not applicable

Compliance for each immunity

Immunity Test	Immunity Test Levels
Electrostatic Discharge IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air
Radiated RF EM fields IEC 61000-4-3	10 V/m 80 MHz – 2.7 GHz 80 % AM at 1 kHz
Rated power frequency magnetic fields IEC 61000-4-8	30 A/m 50 Hz or 60 Hz
Electrical fast transients/bursts IEC 61000-4-4	Not applicable
Surges IEC 61000-4-5	Not applicable
Conducted disturbances induced by RF fields IEC 61000-4-6	Not applicable
Voltage dips IEC 61000-4-11	Not applicable
Voltage interruptions IEC 61000-4-11	Not applicable
Electrical transient conduction along supply lines ISO 7637-2	Not applicable
Proximity fields from RF wireless communications equipment IEC 61000-4-3	See “Test specifications for enclosure port immunity to RF wireless communications equipment”.

Test specifications for enclosure port immunity to RF wireless communications equipment

Test Frequency (MHz)	Band (MHz)	Service	Modulation	Maximum Power (W)	Distance (m)	Immunity Test Level (V/m)
385	380 – 390	TETRA 400	Pulse modulation 18Hz	1.8	0.3	27
450	430 – 470	GMRS 460, FRS 460	FM ±5 kHz deviation 1 kHz sine	2	0.3	28
710	704 – 787	LTE Band 13, 17	Pulse modulation 217 Hz	0.2	0.3	9
745						
780						
810	800 – 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation 18 Hz	2	0.3	28
870						
930						
1720	1700 – 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation 217 Hz	2	0.3	28
1845						
1970						
2450	2400 – 2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation 217 Hz	2	0.3	28
5240	5100 – 5800	WLAN 802.11 a/n	Pulse modulation 217 Hz	0.2	0.3	9
5500						
5785						

Contents

Introduction I

Components and Supplies III

Meanings of Symbols IV

Operating Precautions VI

Electromagnetic Compatibility IX

Contents XII

1 Instrument Description 1

1.1 Indications for Use 1
1.2 Overview 1
1.3 Operator 1
1.4 Features 1
1.5 Name and Function of Each Part 2

2 Preparation 4

2.1 Installing batteries in the main unit 4
2.2 Adjusting Interpupillary Distance and Diopter 5

3 How to Use 6

3.1 Basic instruction 6
3.2 How to Operate Other Functions 6
3.3 How to use the Barrier Filter B (optional items) 22
3.4 How to remove the Optional item cover 25

4 Maintenance and Inspection 26

4.1 Regular Maintenance 26
4.2 Daily Inspection 26
4.3 Replacing Batteries 27
4.4 Cleaning 28

5 Troubleshooting 29

6 Specifications 30

1 Instrument Description

1.1 Indications for Use

The KOWA SL-19 is intended for use in animal's eye examination of the anterior eye segment, from the cornea epithelium to the posterior capsule. It is used to aid in the diagnosis of diseases or trauma which affect the structural properties of the anterior eye segment.

1.2 Overview

The KOWA SL-19 (camera model) is a hand-held slit lamp.
This instrument can record observations by capturing images using the built-in camera.

1.3 Operator

Persons with specialized knowledge of ophthalmic care and who received introductory education of slit lamp observation are required to operate this instrument.

1.4 Features

- Images are recorded by the built-in camera. Recorded images are displayed on the dedicated application software.
  (Please use the displayed/recorded images for reference only. A diagnosis should be made by direct visual inspection through the microscope.)

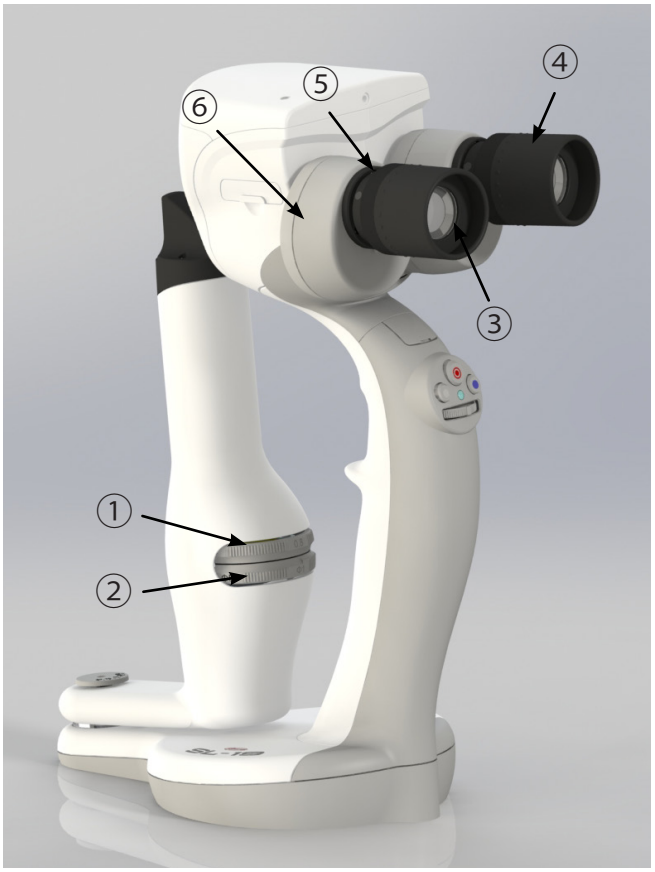
- Slit lamp button that allows the operator to turn on the slit lamp easily with simple action
- White LED used as the light source
- Light intensity dial that can freely change the brightness of the slit illumination
- Equipped with background illumination separately used from the slit light
- Equipped with blue color light for fluorescent staining observation

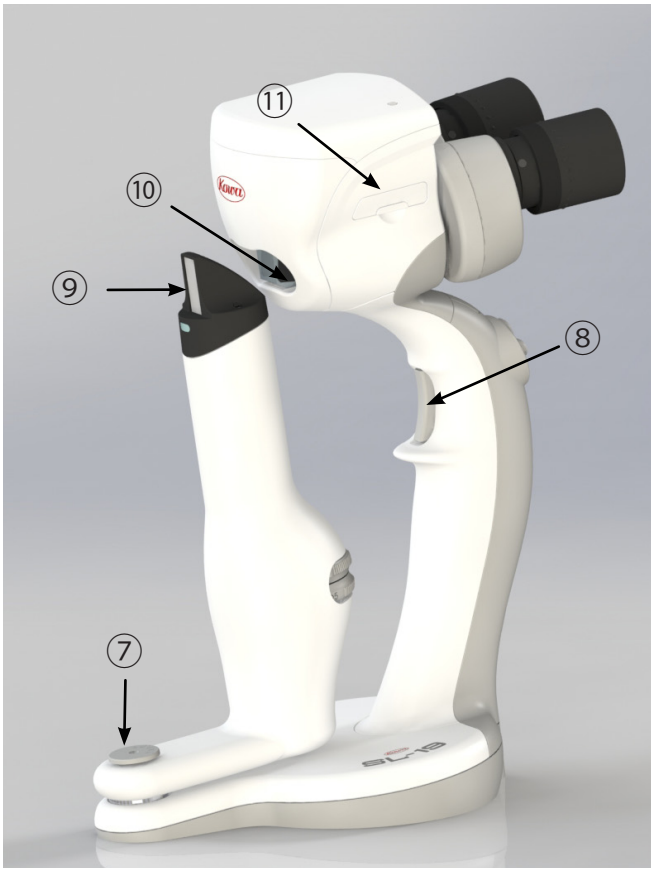
- Easy-to-grip shape
- Lighter than conventional models

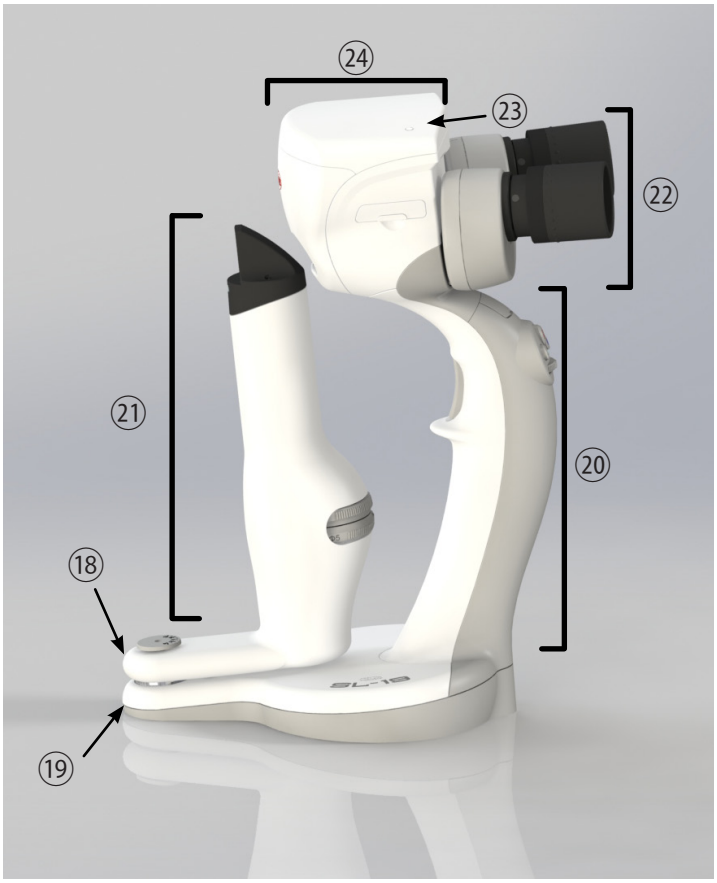
- Power-saving LED for longer operating time
- Indicator blinks orange when the battery level is low

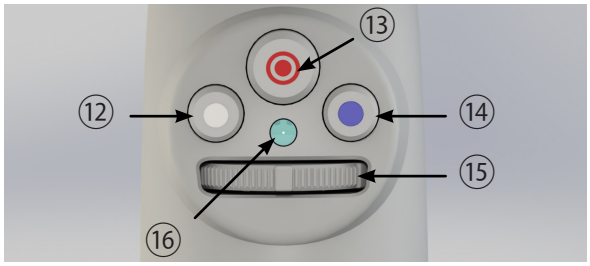
- Can also be used as an indirect ophthalmoscope light source

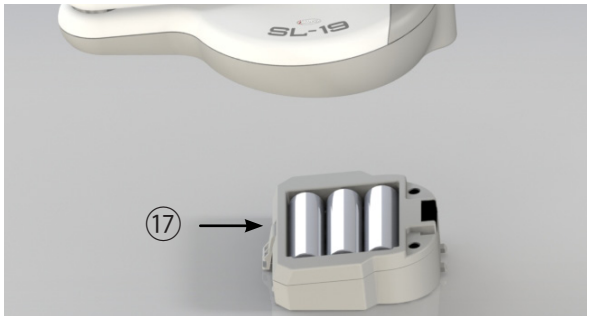
1.5 Name and Function of Each Part









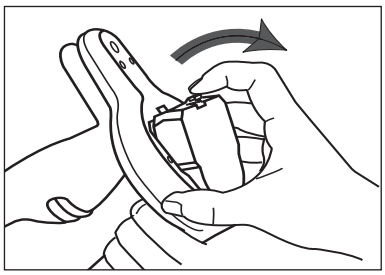


	Name	Function and performance
①	Slit dial	Select slit width and spot. Three slit widths are available: 0.1 mm, 0.2 mm, and 0.8 mm.
②	Spot dial	Select the light diameter of the spot and determine the length of the slit light. Three spot diameters (φ1mm, φ5mm and φ12mm) can be selected and slit lengths can be changed from 1.5mm to 12mm continuously.
③	Eyepiece	Ocular lenses are included in the eyepiece. The user observes patient eye through the ocular lens.
④	Eye cup	Attached to the eyepiece and can be used as guide to adjust the distance of the eye from the ocular lens.
⑤	Dioptric correction scale	Continuously adjust the dioptric power of the eyepiece.
⑥	Prism box	Rotate left and right to adjust interpupillary distance.
⑦	Illumination angle scale	Indicates the swing angle of the illumination light.
⑧	Slit lamp button	Press to turn ON the light, and release to turn OFF.
⑨	Projection prism	Part of prism where the illumination light passes through.
⑩	Objective lens	—
⑪	Optional item cover	Remove the cover to install optional items.
⑫	Back light button	When pressed, the background illumination light turns on. The light intensity can be switched between three levels.
⑬	Camera button	Used to operate the camera power (on/off) and recording (start/stop).
⑭	Blue light button	Press to turn on the blue light for fluorescence observation. The light intensity can be switched between three levels.
⑮	Light intensity dial	The brightness of the illumination light can be continuously adjusted. Turn to the right to make it brighter, turn to the left to make it darker.
⑯	Main unit indicator	Illuminated in green when the unit is turned on. Blinks orange when the battery level is low.
⑰	Battery box	Can contain batteries to be attached to insert the battery into the main unit.
⑱	Revolving arm	—
⑲	Coupled arm	—
⑳	Grip	—
㉑	Illumination unit	—
㉒	Microscope unit	—
㉓	Camera indicator	Indicates the operating status of the built-in camera. Please refer to P.21 about the details.
㉔	Camera unit	—
㉕	Barrier Filter B (optional items)	The Barrier Filter B can be used for fluorescein observation under blue light for clearer observation.
㉖	Filter Band (optional items)	The Filter Band prevents the Barrier Filter B from falling.

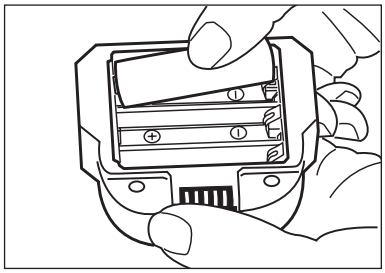
2 Preparation

2.1 Installing batteries in the main unit

(1) While pressing the tab, pull the battery box to remove it from the main unit.



(2) Firmly insert batteries in correct polarity positions as written on the battery box.



Recommended Batteries

Shape	AA
Type	Ni-MH rechargeable batteries

⚠ Caution

Prohibitory

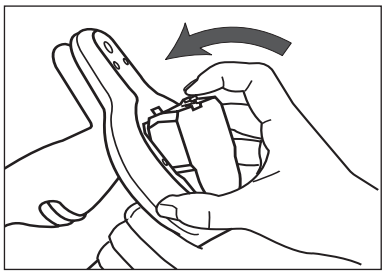
Do not mix different types of batteries.
Do not mix batteries with different residual volumes.

⚠ Caution

Prohibitory

Camera functions do not work properly with alkaline batteries.

(3) Return the battery box to the main unit.
Insert the battery box until the tab makes a click sound.



⚠ Caution

Obligatory

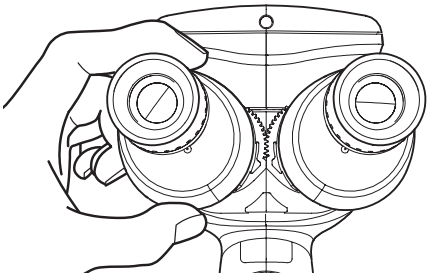
If this instrument is used with the battery box not inserted securely, the battery box may fall, resulting in damage or injury.

(4) Press the slit lamp button and confirm that the main unit indicator lights in green.

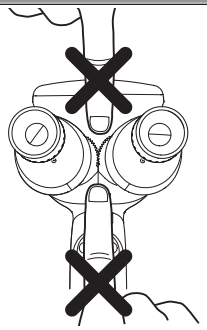
2.2 Adjusting Interpupillary Distance and Diopter

(1) Adjusting interpupillary distance

Adjust the interpupillary distance by rotating the prism box left or right to obtain an appropriate field of view through the eyepieces.



⚠ Caution

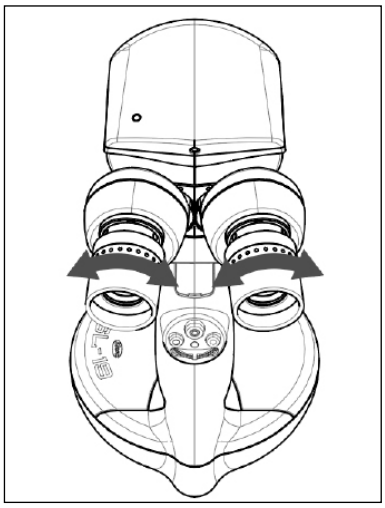
Prohibitory	Do not adjust the interpupillary distance with fingers placed between the prism boxes.	

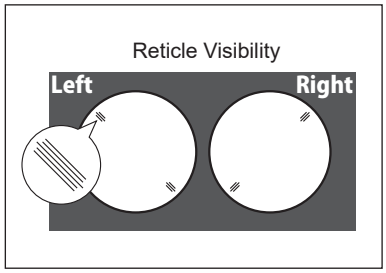
(2) Adjustment of the diopter

Make adjustment for each eye according to the following procedure.

- Turn the dioptric correction scale all the way to the “+” side.
- Looking in the finder, slowly turn the dioptric correction scale toward the “–“ side until the reticle is clearly visible.

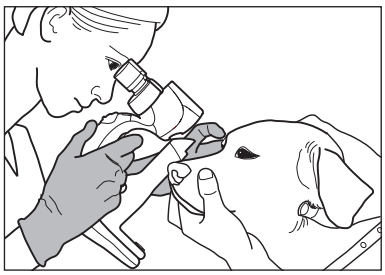
When you are wearing eyeglasses, you may fold back the eye cups.





3 How to Use

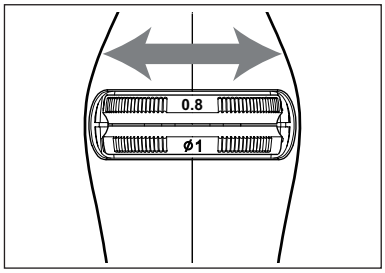
3.1 Basic instruction



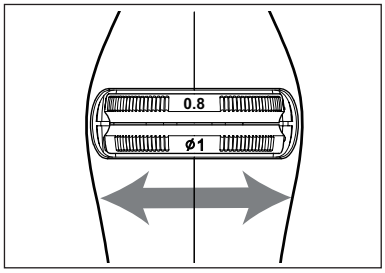
(1) Using the grip, hold the main unit securely in your hand.
(2) Place the thumb of the other hand on the side of the microscope unit and place the other fingers on the patient's forehead.
(3) Stabilize slit width indication by adjusting the distance between the examined eye and the objective lens, depending on how wide the opening is between the thumb and the other fingers when put on the patient's forehead.
(4) Press the slit lamp button and irradiate the light for various observations of the eye.

3.2 How to Operate Other Functions

- Changing slit-width
  Types of slit width: 0.1 mm, 0.2 mm, 0.8 mm and spot (circular).
  Turn the slit dial and set at the click stops.



- Select the slit length and spot diameter
  The slit length/spot diameter can be switched between φ 1 mm, φ 5 mm and φ 12 mm.
  The slit length can also be varied continuously from 1.5mm to 12 mm.
  Turn the spot dial and set it at the click stops or adjust it to the appropriate slit length.



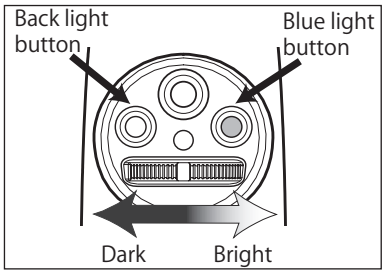
List of slit dial and spot dial settings

No.	1	2	3	4	5	6
Illumination irradiated			1.5↔12			
Slit dial	0.1, 0.2, 0.8	0.1, 0.2, 0.8	0.1, 0.2, 0.8	○	○	○
Spot dial	12	φ1, φ5	1.5↔12	12	φ1, φ5	1.5↔12

IMPORTANT

○ Light other than slits and spots may be irradiated as shown in No.6. This is not a malfunction.

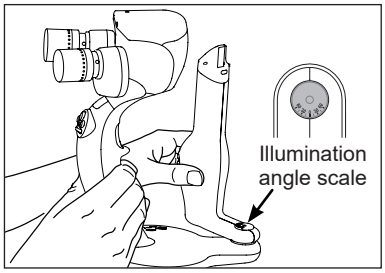
- Adjust the slit light intensity
  Turn the light intensity dial to the right to make it brighter and left to make it darker.



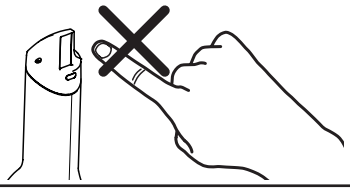
- Use background lighting
  Press the back light button to turn on the background illumination light.
  The brightness can be changed between three levels by pressing the button.
  When the button is pressed 4 times, the light turns off.
  *The slit light can be turned on or off when the background light is on.
  *If no operation state lasts for 10 minutes, the light turns off automatically.

- Use blue lighting
  Press the blue light button to turn on the blue illumination light.
  The brightness can be changed between three levels by pressing the button.
  When the button is pressed 4 times, the light turns off.
  *The slit light can not be turned on or off when the blue light is on.
  *If no operation state lasts for 10 minutes, the light turns off automatically.

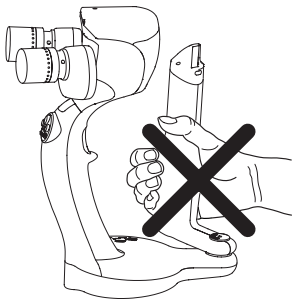
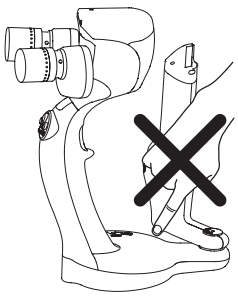
- Adjust the angle of illumination
  Hold the lower part of the illumination unit below the slit dial and the spot dial, and turn the revolving arm parallel with top of the coupled arm.
  The illumination angle can be adjusted around the rotation axis.
  The lighting angle can be checked by the Illumination angle scale.



⚠ Warning

Prohibitory	Do not touch the area around the projection prism while light is being emitted as it becomes hot. 

⚠ Caution

Prohibitory	Do not lift this instrument with the illumination unit. Do not pull the revolving arm up with the coupled arm. 	Do not insert a finger between the revolving arm and the coupled arm and turn the rotating arm. 

● Capturing images with the built-in camera.

This instrument can capture, display, and record images from the built-in camera by using the "Kowa SL-19 dedicated app" (hereinafter referred to as the dedicated app).

This instrument and the dedicated app establish a one-to-one connection via wireless communication. Wireless communication with other external devices is not possible while the computer device on which the dedicated app is installed is communicating with this instrument.

(1)Preparation: Connection settings for this instrument and the dedicated app

○ Preparing the dedicated app

Connect your computer device to the Internet and go to the App Store (online store).

Search for the dedicated app with the keyword "SL-19" inside the App Store and proceed with the installation.

After completing the installation, turn off (disconnect) the Wireless communication of the computer device you are using.

○ Operating environment of the dedicated app

The dedicated app is for the iPad (mobile digital device) series running iPadOS (operating system software) version 15.4 or later.

Please use a device with iPadOS 15.4 or later installed.

*iPad, iPad mini, iPadOS, and App Store are trademarks of Apple Inc.

○ For the Kowa SL-19 dedicated app manual and other documentation, along with new information, please see the product information page on our website.

URL：https://www.kowa.co.jp/e-life/product/slit_lamp_sl-19.htm

https://www.kowa.co.jp/e-life/product/slit_lamp_sl-19.htm

○ Working memo：

Please use it as a memo for connection settings.

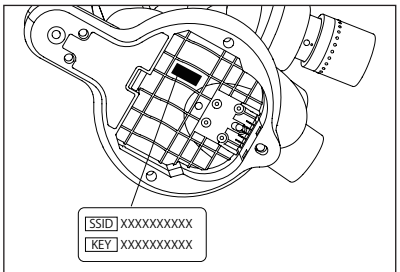
No.	Items	Confirmed/registered settings
1	Initial SSID of Slit lamp	
2	Initial Encryption KEY of Slit lamp	

(1) -1 Preparation Slit lamp

Check the Initial SSID and the Initial Encryption KEY of the slit lamp.

The Initial SSID and the Initial Encryption KEY can be confirmed as shown in the figure on the right.

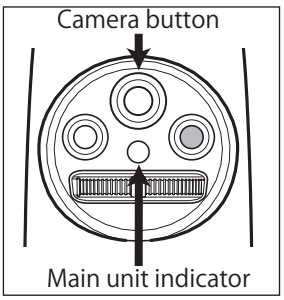
Write down the Initial SSID and the Initial Encryption KEY in No.1 and No. 2 of the working memo, respectively.

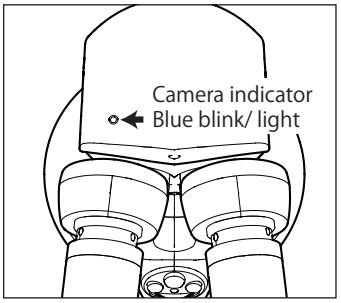


A sticker with the initial SSID and initial Encryption KEY is attached.

After confirming these, press and hold the camera button on the slit lamp body and confirm that the camera indicator blinks in blue.

After pressing and holding the camera button, the camera indicator lights in green first and then blinks in blue.

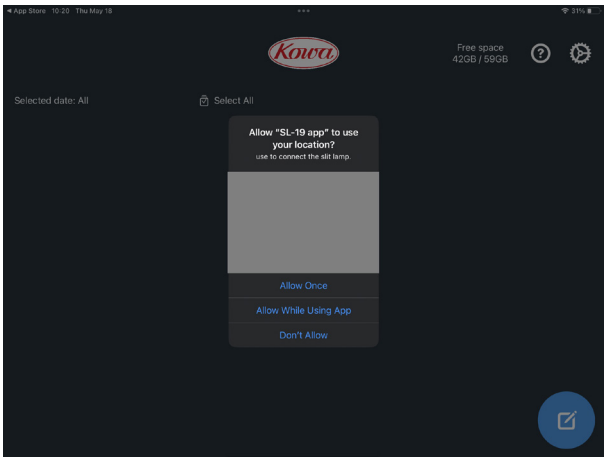




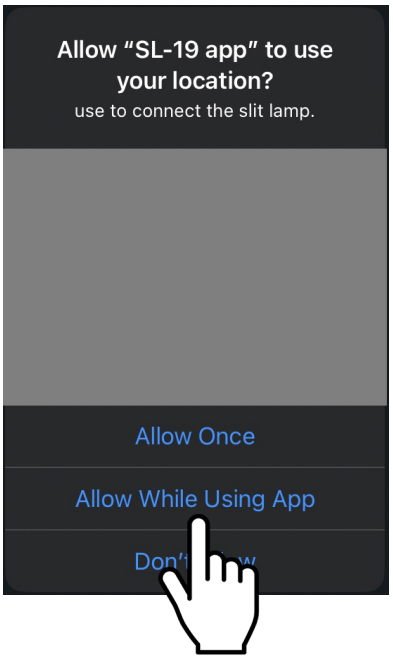
(1) -2 Setting for the dedicated app.

①Tap the Icon of [SL-19 Dedicated App].

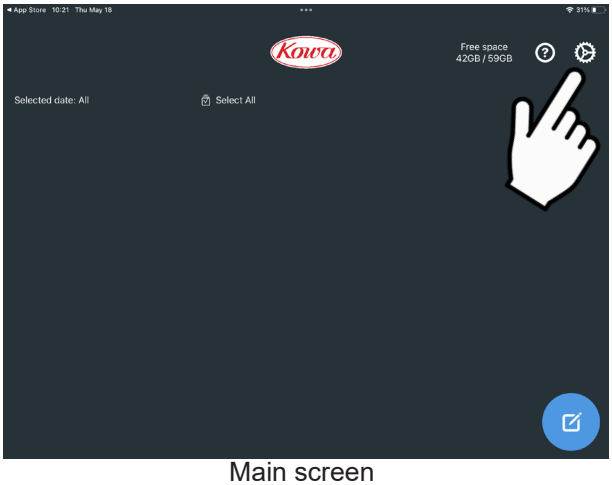
②Application software will start.



③When starting the application for the first time, a message asking for permission to use your location information will be displayed as shown in the right figure.
Tap "Allow While Using App."

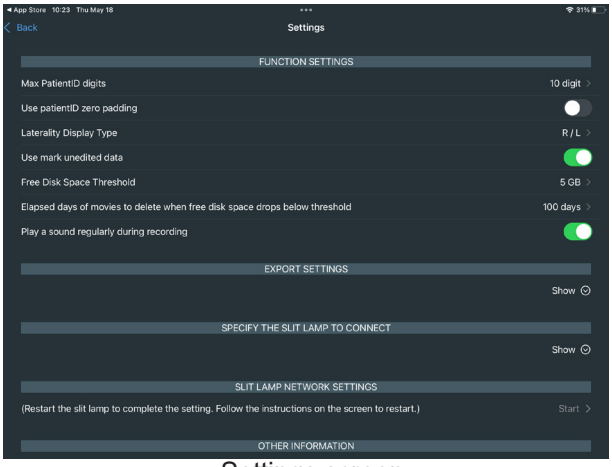


④Tap "Settings" on the top right of the screen.



Main screen

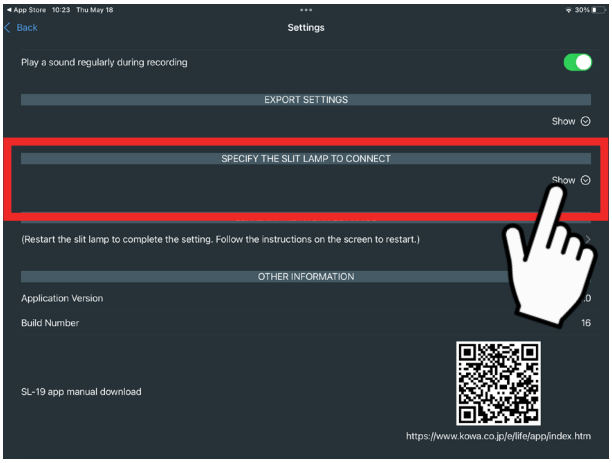
⑤The Settings screen opens.



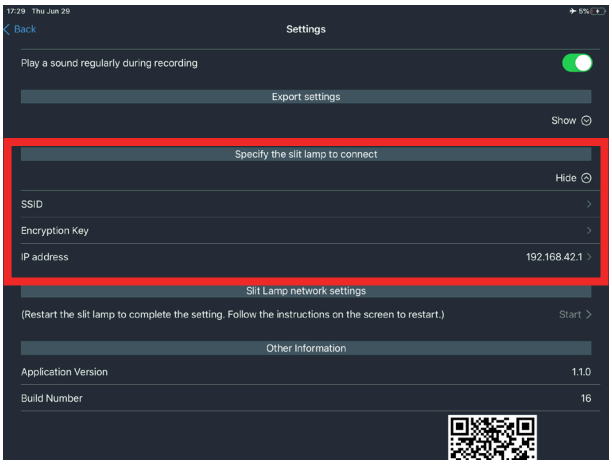
Settings screen

⑥If you scroll down, "Specify the slit lamp to connect" will appear.

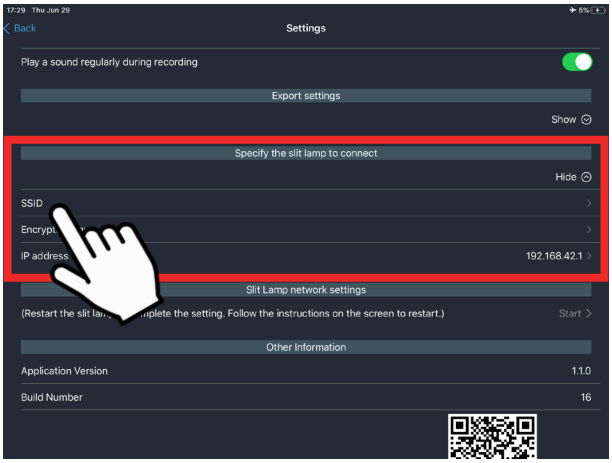
⑦Tap "Show" under "Specify the slit lamp to connect."



⑧The input menu for the SSID, encryption key, and IP address required to specify the slit lamp opens.

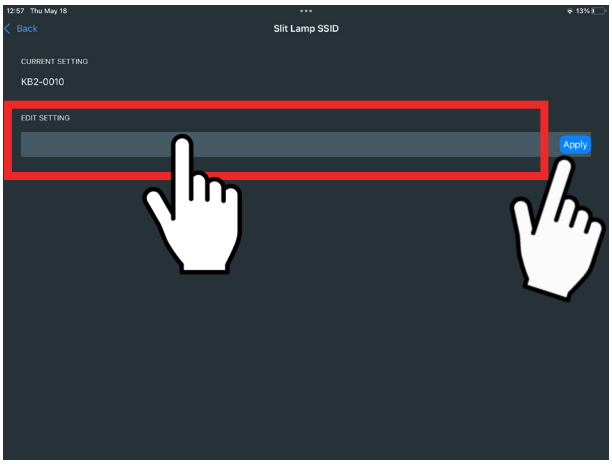


⑨Tap "SSID" in "Specify the slit lamp to connect."

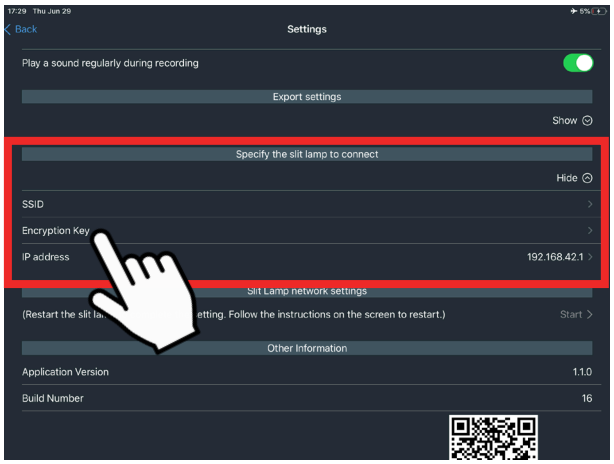


⑩Tap the input field and enter the SSID you confirmed earlier.

⑪Tap "Apply."

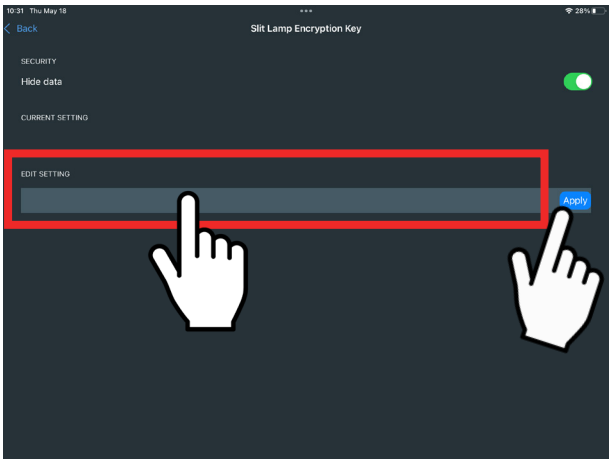


⑫Tap "Encryption key" in "Specify the slit lamp to connect."



⑬Tap the input field and enter the Initial Encryption KEY confirmed earlier.

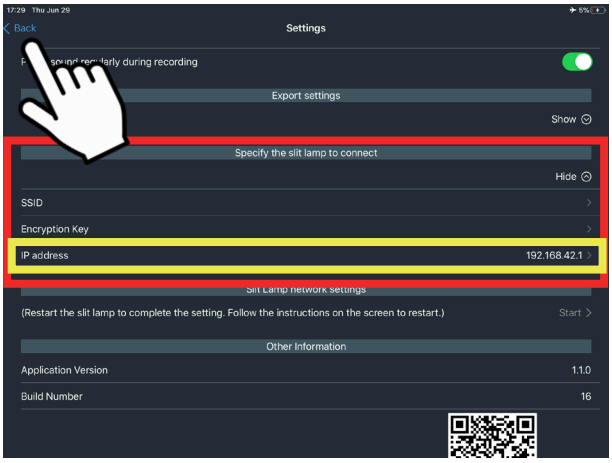
⑭Tap "Apply."



*Uncheck "Hide Data" to temporarily reveal your password.
Please use when confirming that there are no input errors.
However, please be careful about the password ge

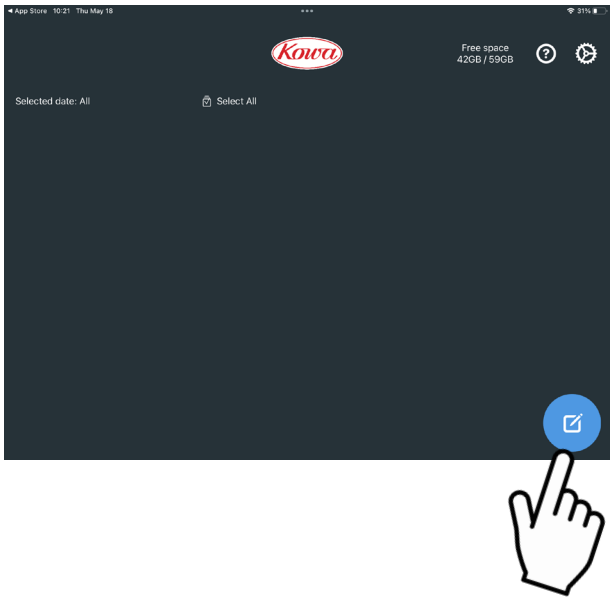
⑮Make sure the IP address of "Specify the slit lamp to connect" is "192.168.42.1".

⑯Tap "Back" at the top left of the screen.

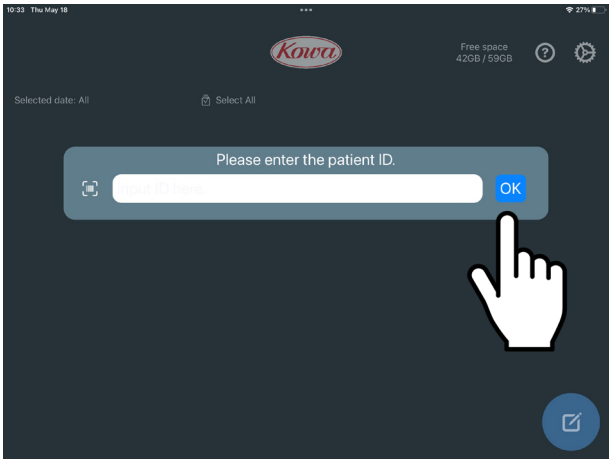


(1) -3 Connection, Capturing Test

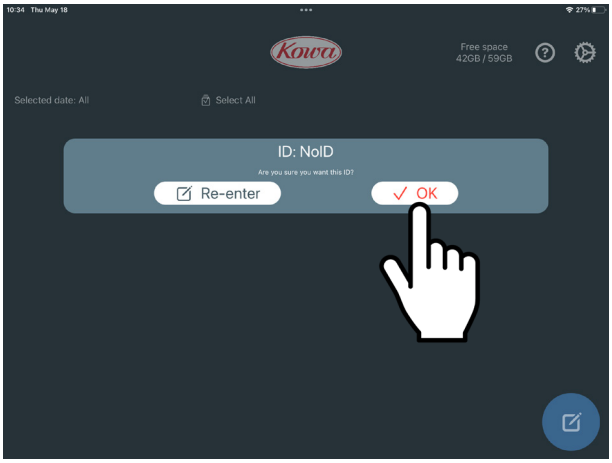
①Confirm that the camera indicator on the slit lamp is blinking in blue. If it is not blinking in blue, press and hold the camera button on the slit lamp until the camera indicator blinks in blue. Tap "ID input" at the bottom right of the main screen.



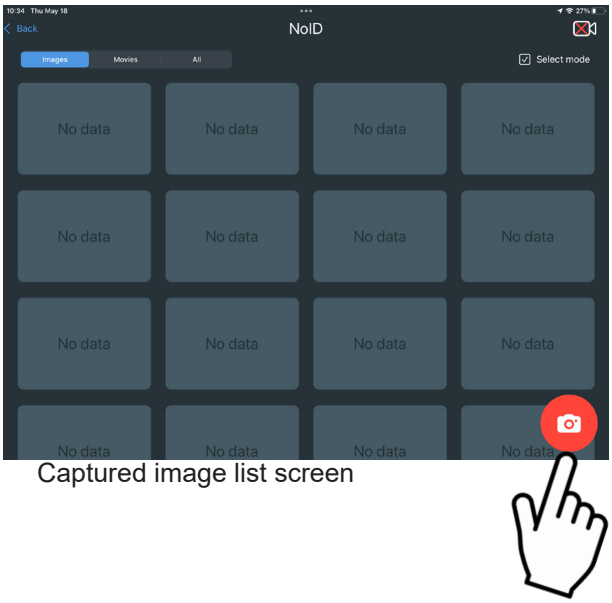
②Tap "OK" on the right side of the dialog displayed.



③Tap "OK" on the confirmation message.



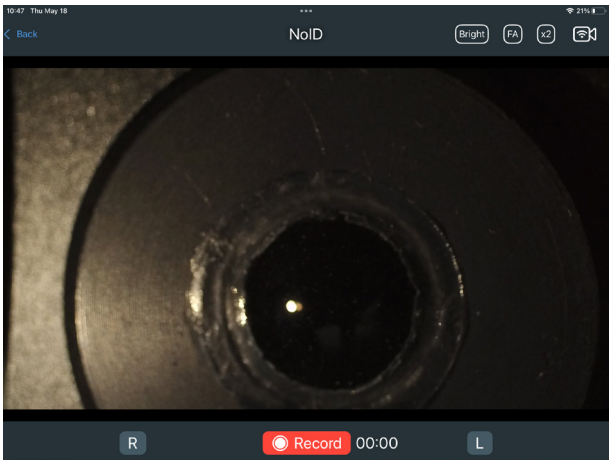
④Tap the camera icon (start movie recording) at the bottom right of the image list screen.



Captured image list screen

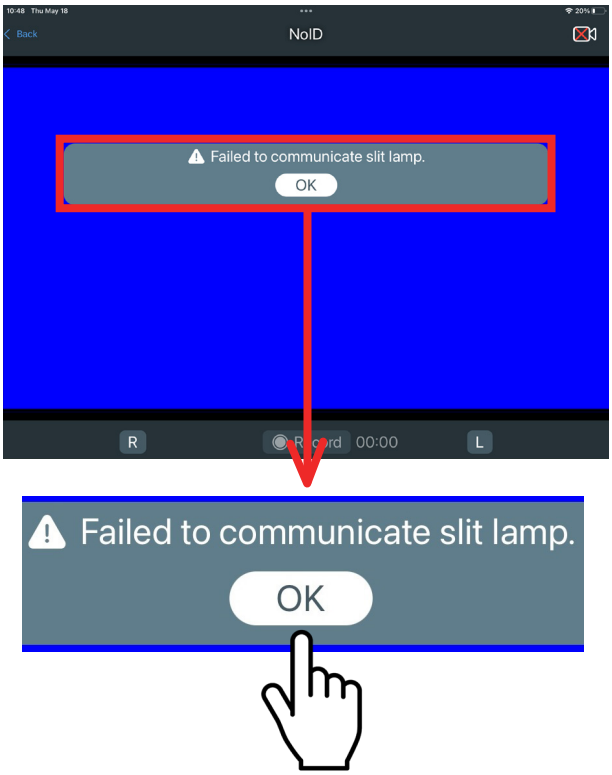
It will take about 10 seconds to connect.

⑤Check if the movies captured by the slit lamp are displayed on the screen.



Capturing image display screen

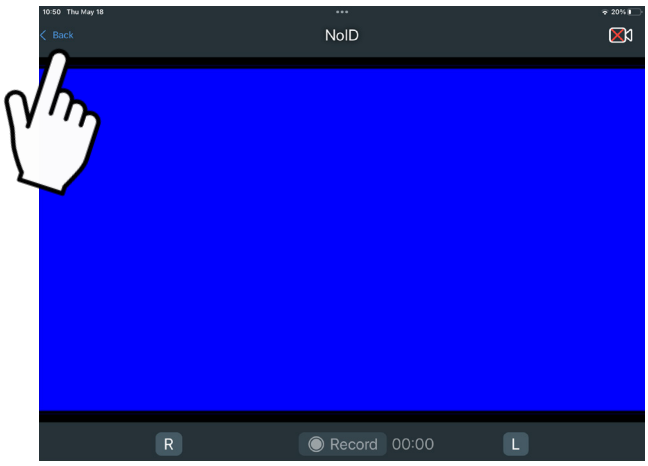
【1st example of Connection failure】



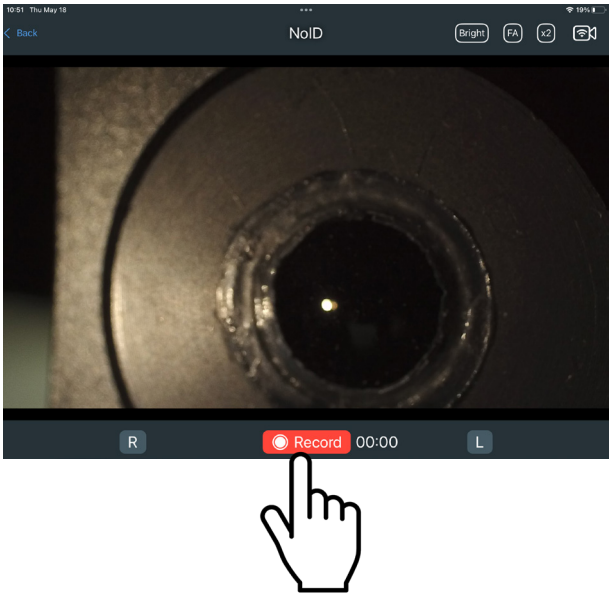
【2nd example of Connection failure】

This message disappears in about 2 seconds.

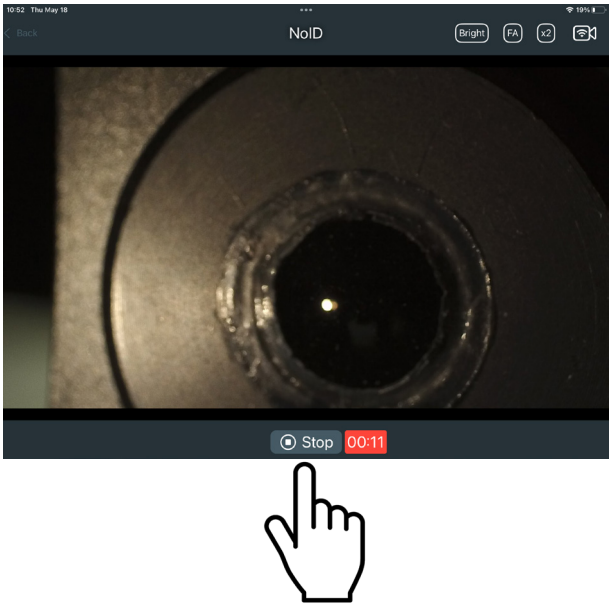
If you see these messages, your settings may be incorrect.
Tap "Back" on the upper left of the screen to return to the main screen, then restart from (1)-1, (1)-2 of Setting for the dedicated app. and review the settings.



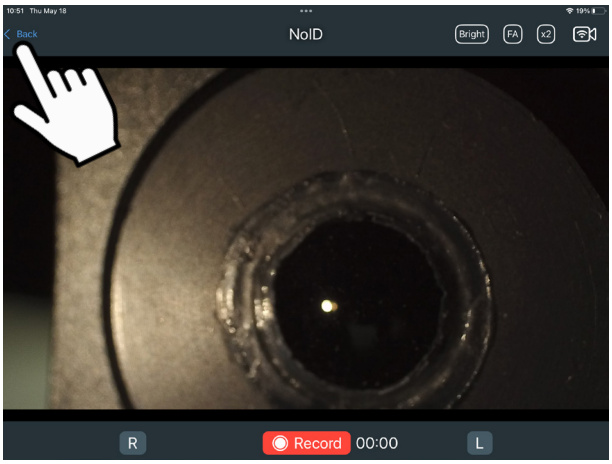
⑥Check if the image displayed on the screen is saved. Capture your hand etc, with the slit lamp and tap "Record."



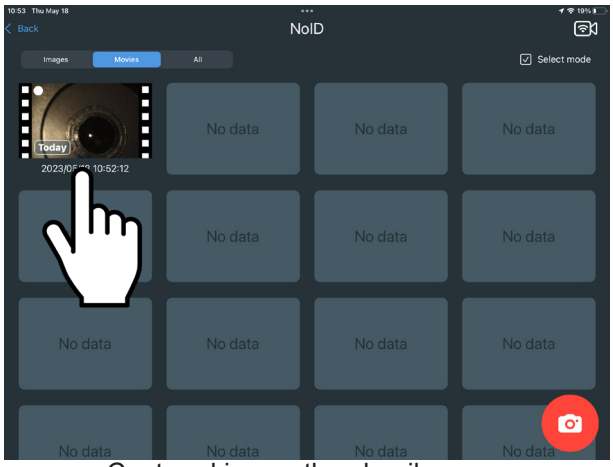
⑦After recording for about 10 seconds, tap "Stop."



⑧Tap "Back" on the upper left of the screen to return to the captured image thumbnail screen.

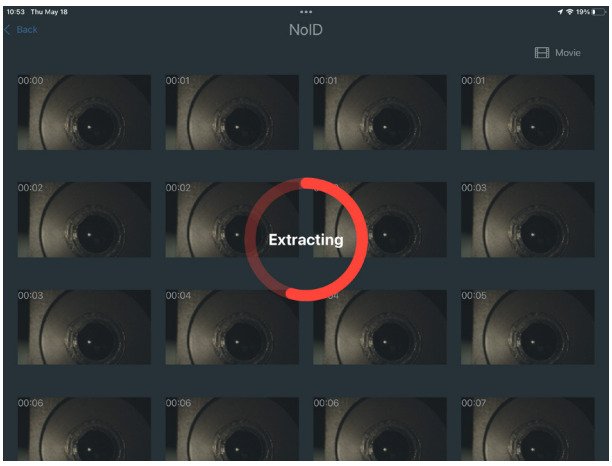


⑨Tap a movie.



Captured image thumbnail screen

⑩Image extraction is performed.

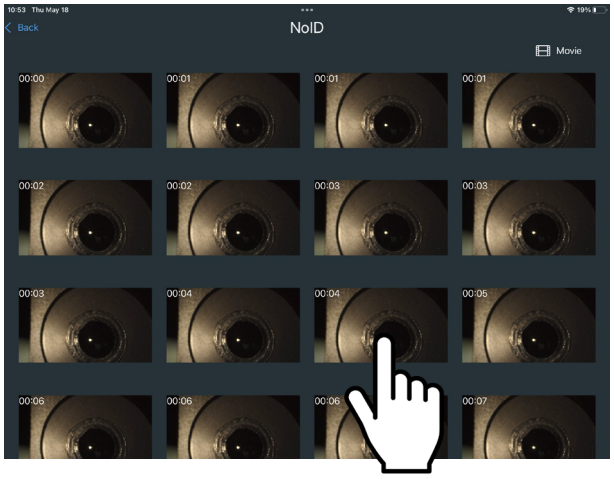


⑪A list of extracted still images is displayed.

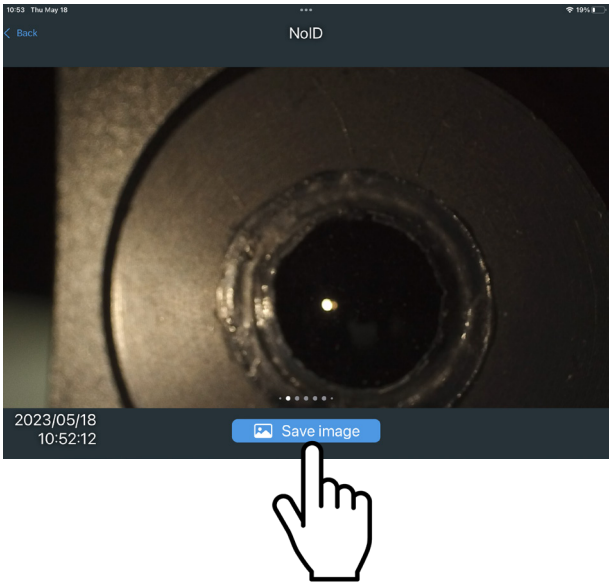
*In extremely dark movies, occasionally no images may be extracted.
In such cases, please try recording again.

Extracted image thumbnail screen

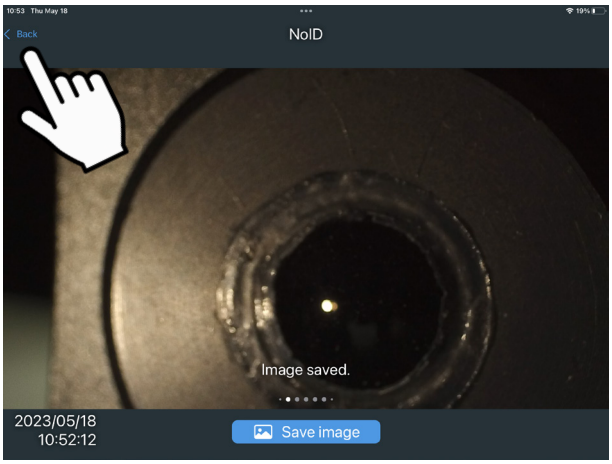
⑫Select an image from the extracted image list.



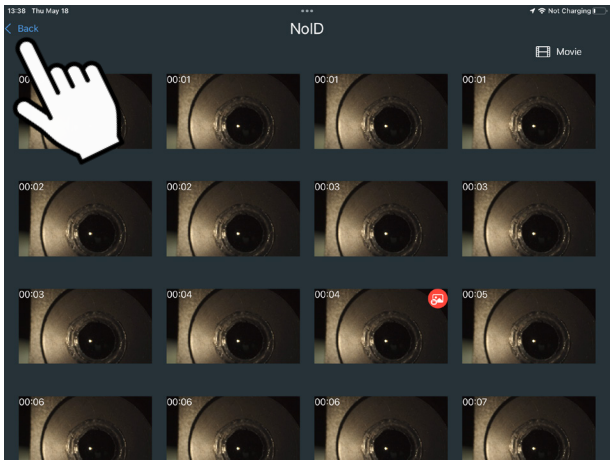
⑬The selected image is displayed.
Tap "Save image."



⑭The image is saved.
Tap "Back" on the upper left of the screen.

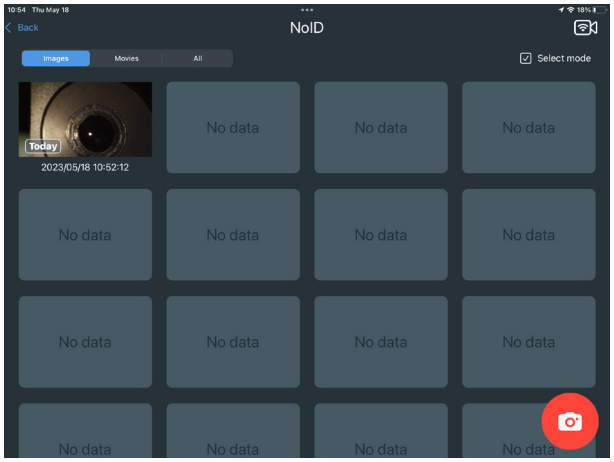


⑮Return to the list of extracted images.
Tap "Back" on the upper left of the screen.



⑯Return to the movie list screen.
Tap the images tab.

⑰Confirm that there is the image saved in step ⑭.



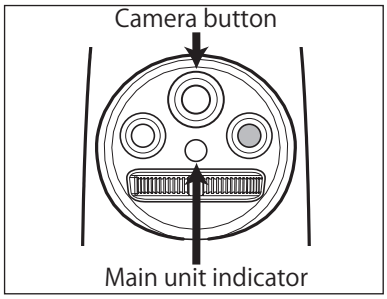
The settings of the slit lamp along with the connection test and capturing test have been completed.

Please use the table below as a memorandum in case the “slit lamp network settings” are changed for security measures, etc. after confirming the connection up to (1)-3.
For details on how to change the settings, refer to the relevant document from the URL on page 8.

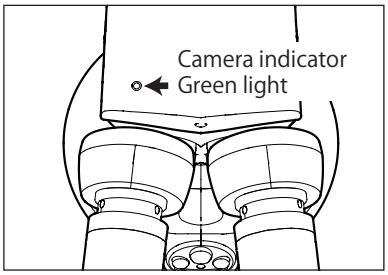
No.	Items	Confirmed/registered settings
1	SSID of Slit lamp	
2	Encryption KEY of Slit lamp	
3	IP address of Slit lamp	

(2) How to start/stop capturing with the built-in camera

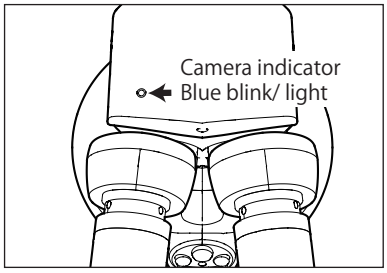
When you press and hold the camera button (approximately 2 seconds or more) while the camera indicator is off, the main unit indicator will blink in green for a certain period of time.
The built-in camera of the instrument is then activated.



While the built-in camera is running, the camera indicator lights up in green. (There is a slight time lag between the blink of the body indicator and the green light of the camera indicator.)



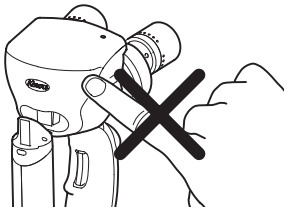
Once the built-in camera completes its boot-up, it waits for a connection with the computer device on which the dedicated app is installed, and the camera indicator blinks blue.
When connected to the dedicated app, the camera indicator lights blue.
After connecting, images can be displayed and recorded using the dedicated app on the computer device.



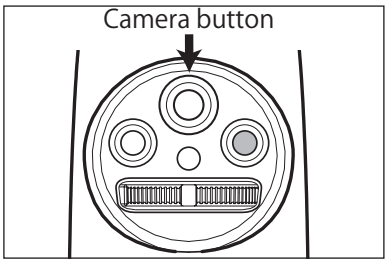
⚠ Warning

Prohibitory

Do not touch the camera unit during camera operation.
It may become hot.



After launching the camera, regardless of whether it is waiting for connection or after the connection, if you press and hold the camera button alone (about 2 seconds or more), the camera operation will stop. (When the camera operation stops, communication with the computer device will stop.)



(3) Functions during capturing with the built-in camera

Pressing the camera button during capturing with the built-in camera will deliver a recording start/stop signal to the dedicated app.

(4) How to use the built-in camera function

As described in "3.1 Basic instruction", primary observation is through the eyepiece. The built-in camera captures images which are close to the image observed through the eyepiece, and the dedicated app captures, displays, and records the images. Any still image can be extracted from the movie and stored on another personal computer or the like.

The dedicated app displays the captured movie in real time, so you can perform alignment on the dedicated app without viewing through the eyepiece. When performing such observations, be careful not to allow the instrument to come in contact with the patient.

Please refer to the manual of the dedicated app to see how to use the app to capture, display, and record images.

About the camera indicator

Status of Indicator	Status of Instrument	Workaround
Green Light	Starting.	Wait for a minute. If it does not change to blinking blue, there is a possibility of malfunction.
Blinking Blue Light	Waiting for the wireless communication.	Start receiving images from this instrument using the dedicated app.
Solid Blue Light	Connected to wireless communication.	To end shooting with the built-in camera, press and hold the camera button for 2 seconds or more. The built-in camera stops and the camera indicator light turns off.
Purple Light	Recording by the dedicated app.	Press the camera button to end recording.
Off	Waiting.	When shooting with the built-in camera, press and hold the camera button about 2 seconds or more.
Yellow Green Blink	A Setting error occurred.	Contact a Kowa representative.

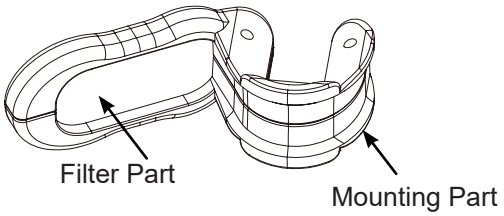
⚠ Caution

- Please use a product that conforms to either IEC60601-1, IEC60950-1, or IEC62368 for the computer device or its power supply on which the dedicated application is installed. Also, the entire system must be configured to meet the requirements of IEC60601-1. The person in charge of building the system is responsible for building it to comply with the requirements of IEC60601-1. If you have any questions, please contact us or our distributors in advance.
- When connecting the computer device with the dedicated app installed to an IT network (when changing the connection environment to the IT network), unexpected problems may occur even when communication with the built-in camera is not being performed. Be sure to conduct a risk assessment and management beforehand.
  Changes to connectivity to IT networks include:
  - IT network configuration change, partial removal
  - Add configuration to IT network
  - Updates or upgrades of equipment in the IT network
  - The foreseeable risks in the event of connection failure are as follows.
  - Captured images are not displayed on the computer device.

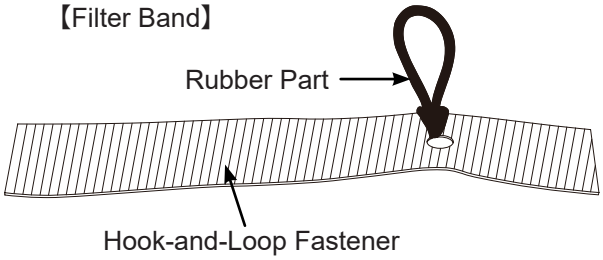
3.3 How to use the Barrier Filter B (optional items)

The Barrier Filter B (optional items) can be used for fluorescein observation under blue light for clearer observation.

【Barrier Filter B】



【Filter Band】



*The Filter Band is a replaceable item.
If deterioration is found during daily inspection, please contact a Kowa representative.

⚠ Warning

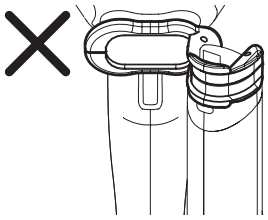
Obligatory

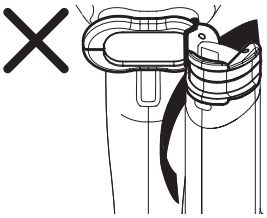
The Filter Band prevents the Barrier Filter B from falling. Please use it.
Natural rubber is used inside the rubber part of the Filter Band.
In rare cases, natural rubber may cause allergic symptoms such as itching, redness, hives, swelling, fever, dyspnea, asthma-like symptoms, decreased blood pressure, and shock.
If you note any of these symptoms, stop using this instrument.

⚠ Warning

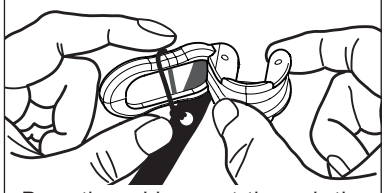
Prohibitory

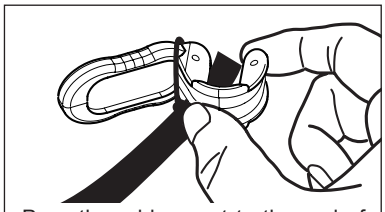
Do Not use as described below;


The Filter Band is not used.

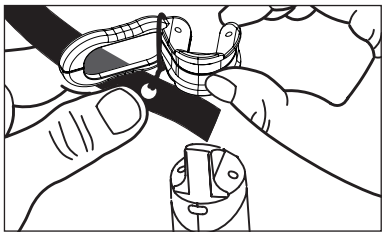

Hook-and-Loop fastener is not wrapped.

(1) Hold the filter frame or the mounting part of the Barrier Filter B and attach the Filter Band as shown in the right figure.
Please be careful not to touch the filter.


Pass the rubber part through the filter part.


Pass the rubber part to the end of the filter part as shown in the figure.

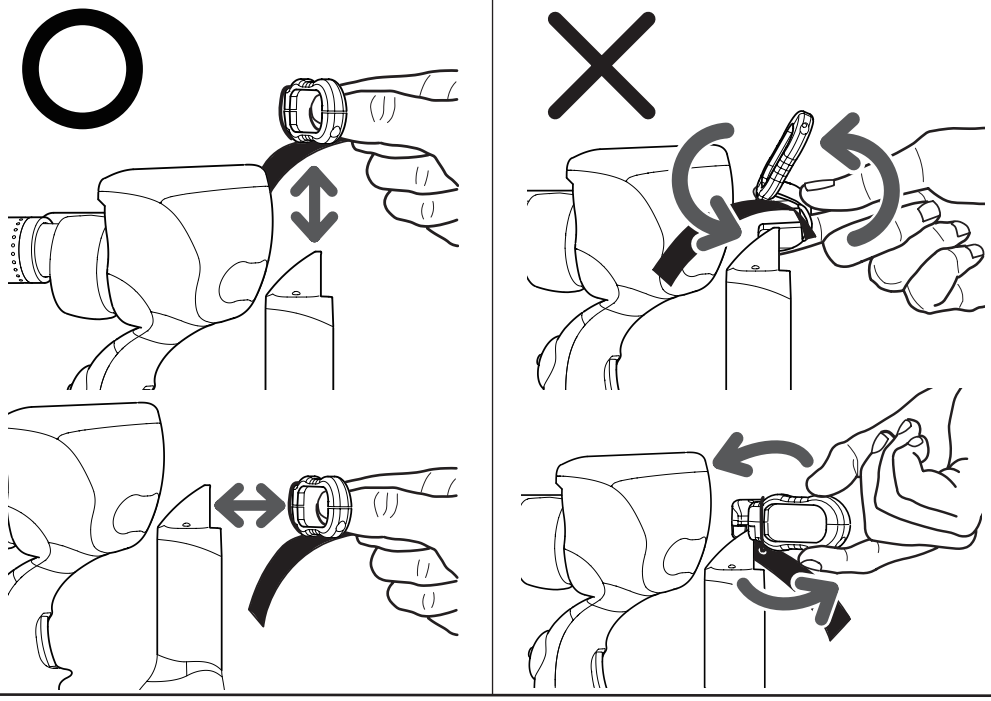
(2) Attach the Barrier Filter B to the Projection Prism.



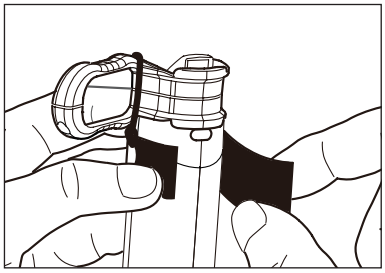
⚠ Caution

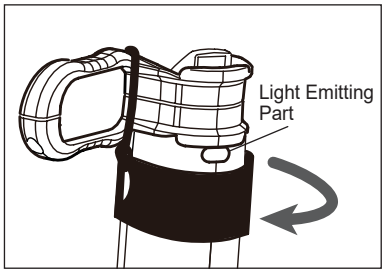
Obligatory

When attaching the filter, insert and remove in a vertical back and forth direction to the Projection Prism so as not to apply twisting force to the Projection Prism.
Twisting or rotating the Projection Prism may change the irradiation direction of the slit light.

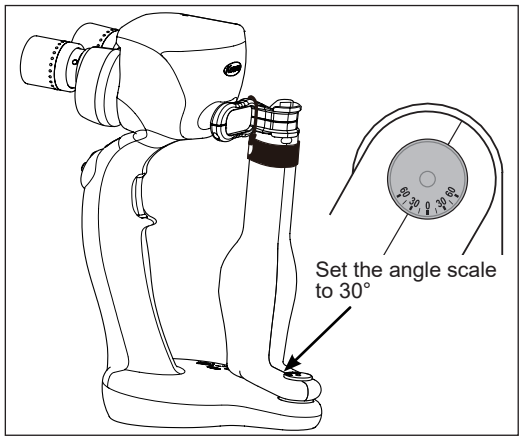


(3) Wrap the Filter Band around the lighting unit.
At this time, be careful not to cover the light-emitting part at the bottom of the Projection Prism.

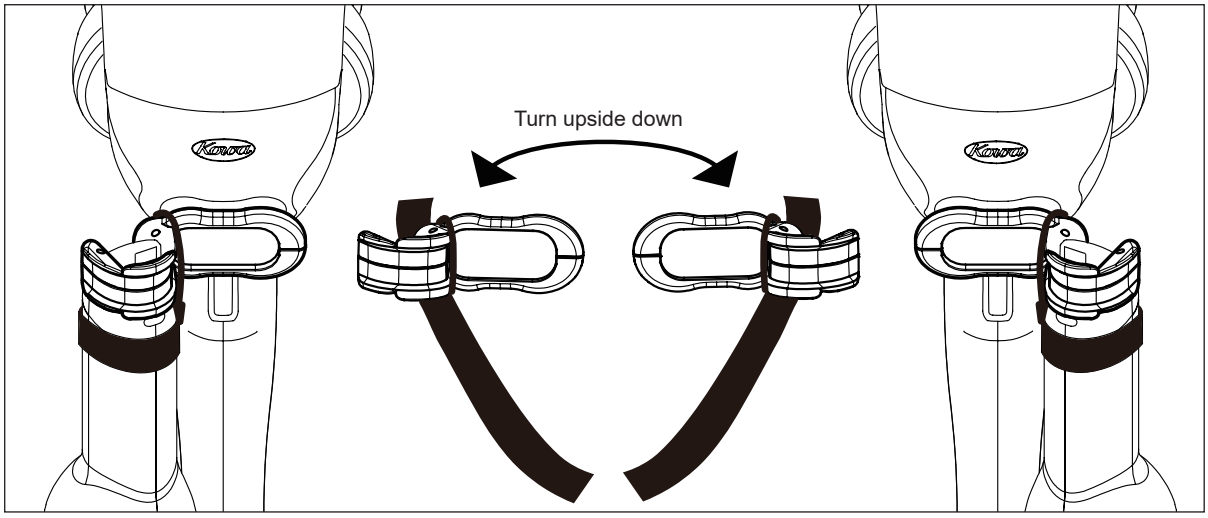




(4) Rotate the Illumination unit.
Rotate the Illumination unit to 30 degrees using the illumination angle scale as a guide.



(5) By turning the Barrier Filter B upside down, the Illumination unit can be used in the opposite direction.



(6) After attaching the filter, turn on the blue light, irradiate the fluorescein-stained eye with blue light, and observe the fluorescence image.

⚠ Caution

Prohibitory

Do not use solvents to clean the Barrier Filter B.
Do not use the Barrier Filter B without wrapping the Filter Band. Do not turn the Barrier Filter B upside down while wrapping the Filter Band around the illumination unit.

⚠ Caution

Obligatory

If the filter becomes dirty, gently wipe it with a soft cloth.
Since the area around the Projection prism becomes hot, turn off the background lighting/ blue lighting when attaching or detaching the filter.

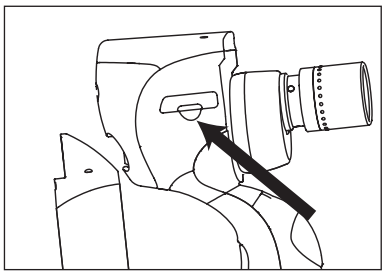
IMPORTANT

○ Slit light irradiation is not possible when the Barrier Filter B is in use.

3.4 How to remove the Optional item cover

When using optional items, remove the optional item cover.
When NOT using optional items, do NOT remove the optional item cover.

Insert an object with a narrow tip into the gap on the side surface of microscope unit to open the cover and remove it.



4 Maintenance and Inspection

This instrument is a precision instrument and not performing regular maintenance and daily inspection may affect the imaging results.
Please read this section carefully in order to use this instrument correctly and safely.

⚠ Caution

Prohibitory

Do not perform maintenance or inspection during use.

4.1 Regular Maintenance

- ○ Make sure to place the dust cover on the instrument after use.
- ○ Take care not to allow dirt, dust, fingerprints, tears, etc. to adhere to the projection prism, the objective lens, the eyepiece, and the Barrier Filter B (optional items).
- ○ Clean the instrument with a soft piece of cloth. For obstinate dirt, apply diluted detergent.
- ○ If the instrument will be not used for extended periods, remove the battery box from the main unit and remove batteries from the battery box.

4.2 Daily Inspection

Follow the KOWA SL-19 (Camera Model) Daily Inspection Table for routine inspection of this instrument.

KOWA SL-19 (Camera Model) Daily Inspection Table			
Inspection item		Procedure	Acceptability criteria
Main unit	Enclosure	Visually verify that there is no problem.	There is no deformation.
	Projection prism Objective lens Eyepiece Barrier Filter B	Visually verify that there are no flaws or contaminants on the lenses.	There are no flaws or contaminants.
	Slit lamp button	Operate and confirm that the button works correctly.	Light and main unit indicators should light up when pressed.
	Slit dial Spot dial	Move the dial to see that it moves without any problems and has clicks.	The dial should move smoothly. There should be clicks.
	Light intensity dial	Move the dial to see that it moves without any problems.	The dial should move smoothly.
	Label	Visually check that the label is securely installed and that all indications are clearly visible.	The label must be securely installed. All indications must be clearly visible.
	Terminal part	Visually check if the terminal parts are soiled.	They should not be soiled or black.
Battery box	Enclosure	Visually verify that there is no problem.	There is no deformation.
	Terminal part	Visually check if the terminal parts are soiled.	They should not be soiled or black.
Filter Band (optional items)	Rubber part	Gently pull and stretch to check that there is no slack. Visually check that the coating is not torn.	There is no slack. There is no torn in the coating.
	Hook-and-Loop fastener part	Visually check that there is no noticeable fluff and that the hooks are not clogged with dust. Close the Hook-and-Loop fastener to check that it does not come off easily.	No noticeable fluff. The hooks were not clogged with dust. Does not come off easily.

4.3 Replacing Batteries

The main unit indicator blinks when the battery level is low. In this case, replace the battery.

Approximate Operating Time: About 60 minutes when the slit light and background light are continuously turned on at maximum light intensity while continuously capturing movies with the built-in camera and using Ni-MH Rechargeable batteries (1900mAh)

IMPORTANT

- ◯ Note that continuous lighting time will vary depending on temperature or frequency of charging.
- ◯ The capacity of the rechargeable battery gradually decreases even when not in use.
  We recommend that you always have a spare battery ready for use when the remaining capacity decreases.

About the main unit indicator

Status of the indicator	Status of the main unit	How to deal with
Green	Slit light, background light, or blue light is illuminated. There is no problem with the residual capacity of battery.	When all lights are turned off, the main unit indicator also turns off.
Blinking orange light	While the slit light, background light, or blue light is illuminated, or the built- in camera is initializing, this indicates the battery level is low.	May be able to use for a short time, but please replace or recharge the battery.
Off	Waiting state	When the slit lamp button is pressed and the background/blue light button is pressed, the main unit indicator is shows the remaining battery power.
		If the light does not turn on even when the slit button is pressed or the background light/ blue light button is pressed, the battery level is insufficient. Replace the battery.
	The battery is not installed.	Install the battery.

4.4 Cleaning

4.4.1 Cleaning the exterior

If the exterior is dirty, clean it using the following procedure:

(1) Wipe the surface with a firmly squeezed, dampened soft cloth.

(2) Wipe off obstinate dirt with a soft cloth, after dampening the cloth with a small amount of neutral detergent diluted in lukewarm water and firmly squeezing it.

⚠ Caution	
Prohibitory	Do not wipe the exterior with benzene, thinner, or ethanol. It may lead to discoloration or deterioration.
	Do not allow terminals to come into contact with water. Failure to do so may lead to failure. If the terminals are soiled, wipe with a dry soft cloth.

4.4.2 Cleaning the projection prism, the objective lens, the eyepiece, and the Barrier Filter B (optional items)

If the projection prism, the objective lens, the eyepiece, or the Barrier Filter B becomes dirty, clean them using the following procedure:

(1) Blow off debris or dust on the lens surfaces using a blower.

(2) When it cannot be cleaned by step (1), moisten cleaning paper with anhydrous ethyl alcohol and lightly wipe whole surface of the lens starting from its center in a circular motion. Repeat this step several times.

(3) If any soil cannot be removed by steps (1) through (2), contact KOWA or an authorized KOWA dealer.

POINT Use new lens cleaning paper every time you wipe.

IMPORTANT

- ○ Wiping the projection prism, the objective lens, the eyepiece and the Barrier Filter B (optional items) without removing dust and debris beforehand may scratch the lens surface.
- ○ Do not use chamois leather, silicon cloth, etc.
- ○ Carefully store and handle anhydrous ethyl alcohol.
- ○ Do not use any other agent or cloth.
- ○ The capacity of the rechargeable battery gradually decreases even when not in use.
  We recommend that you always have a spare battery ready for use when the remaining capacity decreases.

5 Troubleshooting

When a problem occurs, check the items shown below first. Look for the problem from those shown in the following list and apply the applicable remedy. If the applicable remedy does not eliminate the problem or you encounter a problem that is not listed, contact KOWA or an authorized KOWA dealer.

Abnormal performance of the instrument		
Problem	What to check·State of instrument	Applicable remedy
The lamp dose not illuminate when the slit button is pressed.	Is the battery box in place?	Install the battery box.
	Is the main unit indicator blinking?	Charge the rechargeable battery. Alternatively, replace the battery with a new one.
	Battery is coming out.	Firmly insert batteries in correct polarity positions.
	Are the batteries being inserted oppositely of the positive and negative marks?	Firmly insert batteries in correct polarity positions written on the battery box.
	Is the spot dial displaced?	Set the spot dial to the continuously variable range (between 1.5 and 12 displays) or to a click position.
	Is the slit dial displaced?	Align the slit dial in a click position.
	Does the light intensity dial rotate?	With the slit lamp button pressed, turn the light intensity dial to the right to make it brighter.
The lamp goes off quickly. (battery consumption is fast)	Are the batteries charged?	If you are using a rechargeable battery charge the battery.
	Are the batteries depleted?	Replace with new batteries. The rechargeable battery gradually deteriorates after repeated charging and discharging.
The slit tilts.	Is the slit dial displaced?	Align the slit dial with the location of the clip.
Part of the illumination light or slit is obscured.	Is the slit dial or spot dial displaced?	Align the slit dial or spot dial to a click position.
Light other than slits and spots are illuminated (see figure below). 	Is the slit dial set to ○ and the spot dial set between 1.5 and 12	When the slit dial is set to ○ and the spot dial is set to between 1.5 and 12, the light as shown in the left figure is emitted. This is not a malfunction. When the slit dial is set to 0.1, 0.2, or 0.8 in this state, the slit light is illuminated.
Out of focus.	Is the diopter adjustment incorrectly set at a point away from a desired value?	Adjust to an appropriated diopter.
The captured movies are not displayed on the computer devices.	Is the camera indicator still blinking in blue?	Recheck the connection settings by the computer device.

6 Specifications

<Main unit>

Microscope

Type of microscope	Binocular-stereoscopic-orthoscopic microscope
Angle of convergence	13°
Total magnification	10X
Objective lens' working distance	Approx. 100 mm
Practical field of view	φ 15 mm
Reticles	Built-in both eyepieces
Interpupillary distance adjustment range	55 to 72 mm
Diopter adjustment range	-8 to +5 D
Camera's working distance	Approx. 78 mm
Camera's field of view	27.3 mm×15.3 mm
Effective pixels	Approx. 2M
Interface	Wireless LAN (IEEE802. 11 a/b/g/n)

Light-emitting section

Slit light	
Light source	White LED
Switching method	Turret
Width/Shape	0.1 mm, 0.2 mm, and 0.8 mm Spots (circular)
Slit length	1, 5, 12 mm: fixed, and 1.5 to 12 mm: continuously variable
Spot	Ø1 mm, Ø5 mm, Ø12 mm
Light intensity adjusting	Continuously variable Minimum: 200 Lux Maximum: 20,000 Lux
Slit's illuminating angle	Horizontal circumference ± 60°
Background illumination light	
Light source	White LED
Light volume	3 Step switching
Blue illumination light	
Light source	Blue LED
Light volume	3 Step switching

Electrical Ratings

Input voltage	DC3.0 — 4.8 V
Power consumption	6 VA

Other

Dimensions/Weight	107 (W)×197 (D)×255 (H) mm/730 g (No batteries)
Expected service life	8 years

Technology for Life Science

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