

IPLX UltraLite

Instructions

OLYMPUS

IPLX *UltraLite*



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Introduction

Intended use

This instrument is intended for inspecting and observing the interior of machinery, equipment, materials, and other objects, without damaging the object being inspected.

Instruction manual

This manual contains information about instrument operations and handling, which makes it possible for the instrument to be used safely.
Before using the instrument, carefully read the contents of this manual to ensure that you use the instrument correctly. After reading the manual, store it and the warranty agreement in a safe place. If you have any questions about any information in this manual, please contact Olympus.

Product configuration

For information about the configuration of devices required by this product and devices that can be used in combination with it, see "System chart" (P. 44) in the "Appendix".
Note that use of this product in combination with options and separately available items not only creates the risk of abnormal operation, it also can damage the product.

Important Information–Please Read Before Use

Marks used in this manual

The following signal words are used throughout this manual.



DANGER

- Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

- Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

- Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or potential material damage.



NOTE

- Indicates additional helpful information.

Safety precautions

General safety precautions

Observe the precautions described below when handling the instrument. The information is to be supplemented by the dangers, warnings and cautions given in each chapter. Safety cannot be guaranteed when the instrument is used in ways that are not specifically described.



DANGER

- Never use this instrument for observation inside a human or animal cavity. Otherwise, death of the person or animal may result.
- Never use the instrument in the following types of environments.
 - Where flammable atmospheres are present
 - Where metal dust or other dust is presentOtherwise, an explosion or fire may result.



WARNING

- Do not repair, disassemble, or modify the instrument.
This instrument does not contain any user serviceable parts. Do not disassemble, modify or attempt to repair. User injury and/or equipment damage can result.
Contact Olympus for all repair and servicing.
- Immediately stop using the instrument at the first sign of smoke, abnormal odor, abnormal noise, or any other abnormality.
Even if operation of the instrument is still possible, turn off power.
- Do not insert the insertion tube into an observation object that is in operation or conducting electricity.
Otherwise the insertion tube may be damaged by being caught inside of the observation object, etc., or the insertion tube may touch the object, resulting in electric shock.
- Before stowing the instrument in its carrying case, be sure to turn off power and remove the battery.
Leaving the battery loaded during storage can cause it to become hot, causing the risk of fire.



CAUTION

- Do not use this instrument in any environment (including strongly radioactive environments) that does not conform to the specified operating environment.
Otherwise, unexpected accidents that may damage the insertion tube may result.
- Do not insert the insertion tube into an observation object in an environment that is outside the operating temperature range.
A temperature alarm function will display a message whenever a temperature outside the operating temperature range is approached.
If this happens, immediately remove the insertion tube from the observation object. Continued use may damage or reduce the performance of the instrument.
- Do not continue to use the instrument when it is wet with condensation.
Sudden temperatures changes such as those that occur when entering a warm room from the outside cold can cause condensation to form inside the instrument. Using the instrument while it is wet with condensation can cause malfunction. If condensation forms, leave the instrument in the environment where it is to be used and allow the condensation to dry before using it.
- Do not cover the main unit with a plastic bag or other object during use.
If the inside of the instrument cannot be cooled, the instrument damage may result.
- Take care not to have your feet caught by a cord including the power cord or insertion tube.

-
- Use only a power cord and AC adapter specified by Olympus.
Using equipment not specified by Olympus may damage the instrument causing smoke or fire.
 - To ensure electrical safety, connect the power cord to a 3P power outlet.
Electrical safety designed into the product by Olympus cannot be guaranteed if there is no connection to power outlet ground.
 - Do not unplug the power cord while the instrument's POWER button is on.
 - Do not use the AC adapter outdoors.
Otherwise, electric shock might occur, or smoke emission and fire might occur, causing damage to the instrument.
The AC adapter is designed for indoor use.
 - Do not subject the AC adapter to strong impact cause by striking it against a wall, dropping it, etc.
Otherwise, malfunction, damage, or electric shock might occur.
 - Do not leave the distal end illumination on.
Otherwise, the illumination emitted from the distal end may heat up a nearby object and cause it to ignite. Whenever stopping operation, be sure to turn off illumination.
 - Do not look directly into the illumination being emitted by the distal end.
Otherwise, eye damage may result.
 - Do not expose the LCD monitor to strong impact, strong pressure, or to scratching by a hard or pointed object.
Otherwise, the LCD monitor might be cracked or scratched, or a damaged monitor could create the risk of personal injury.
 - Do not subject the insertion tube or other cables to strong pulling, and do not move the main unit around by holding the cables.
Otherwise, the insertion tube and/or cables may be damaged.
 - Do not allow any liquids other than water, saltwater, machine oil, or diesel oil come into contact with the insertion tube.
Otherwise, the insertion tube may be damaged.
 - Do not allow water to come into contact with parts other than the insertion tube.
Water creates the risk of electric shock. The parts of the instrument other than the insertion tube, including the carrying case, are not watertight, so the instrument should not be used or stored where it is submerged or wet.
 - Do not subject the distal end to severe impact or pulling, and do not expose the angulation section to severe impact or bending.
Otherwise, the precision components that make up the distal end and the angulation section might be damaged.
 - Note the following precautions whenever operating the angulation section.
 - Do not bend the insertion tube to a radius that is less than its minimum bend radius (20 mm for the 4 mm type, 30 mm for the 6 mm type).
 - Should you sense any abnormality when performing angulation operation, do not try to force the angulation operation.
Doing so can damage the insertion tube or observation object.
 - Do not drop the optical adapter or otherwise subject it to strong impact.
The optical adapter is a precision instrument. Glass lenses are used in the optical system, and so care is required during handling.
 - Never use the instrument without an optical adapter mounted.
Otherwise, parts (screws, etc.) are easily subjected to deformation due to contact with hard objects, etc. Deformed insertion tube parts can make it no longer possible to mount an optical adapter and can cause the optical adapter to fall off. Never use the instrument without an optical adapter mounted.
Also note that an optical adapter by itself is not watertight. Water getting into the area where the insertion tube and optical adapter join might cause malfunction or damage.

-
- Never use an optical adapter when any of its parts are loose.
Otherwise, a loose part might fall into the inspection object.
 - If an optical adapter cannot be mounted or removed because the nut will not turn, stop using it.
Contact Olympus.
 - Do not allow metal or other foreign objects to enter the main unit through connectors or any other openings.
Otherwise, a malfunction or electric shock may result.
 - Avoid accidentally dropping the main unit while cables or devices are attached to connectors, otherwise, the connectors and/or connected items might become damaged.
 - Whenever connectors become wet, wipe them clean before use.
Also, should connectors become clogged with foreign matter, remove the foreign matter before use.
 - Use the USB connector to connect the USB cable that is provided as standard.
 - Note the following precautions whenever handling the battery cover, SD card cover, and AC adapter connector cap.
 - Do not open or close covers/caps while your hands are wet.
 - Do not open or close covers/caps in an area subject to high humidity and/or dust.
 - Close covers/caps before storing the instrument and when they are not in use.
 - Check to make sure that the SD card is correctly loaded before using it.
The SD card might come out if it is not inserted into the slot as far as it will go, if the instrument is subjected to impact during transport, etc.
 - Do not remove the battery or AC adapter while the system is running.
Otherwise, recorded data may be damaged.
 - Should the battery indicator start to flash, immediately turn off power or connect the AC adapter.
Continued use of the instrument will result in it shutting down, which could destroy recorded data.
 - Connect the AC adapter, do not insert or remove an SD card, and do not connect or disconnect the USB cable while image data is being exchanged with a PC.
Otherwise, the data recorded in the SD card may be destroyed.
 - Note the following precautions whenever removing the instrument from its carrying case.
 - Do not apply undue force when pulling the insertion tube from the slot in the cushion.
 - When removing the main unit, do not lift it up by the insertion tube.Otherwise, the instrument may be damaged.
 - Note the following precautions whenever stowing the instrument in its carrying case.
 - Make sure that the insertion tube is not twisted before storing it.
 - Make sure the distal end has cooled before storing it.
 - Before stowing the instrument, align the "F" mark on the angulation lock ring with the "-" mark and then release the angulation lock.
 - When you have the instrument hung from your neck, take care to avoid getting tangled with other nearby items.
Take care to avoid entanglement and possible strangulation.
 - Regularly back up recorded data.
Recorded data is subject to damage by unforeseen events.
 - Do not store the instrument in the following locations.
 - Environments subjected to high temperature, high humidity, and large amounts of dust or particulate
 - Locations exposed to direct sunlight or radiation
 - Locations subject to gas that includes halide^{*1}Doing so could damage the equipment.

^{*1} The performance of some kind of electric parts will be deteriorated by the gas including the halide contained in the insecticide, the herbicide, and the gas extinguishant, etc.

- When disposing of this product, be sure to do so in accordance with all local laws, rules, and regulations.
Before disposing of this product, check your local laws, rules, and regulations and follow them accordingly.

Battery precautions

Should you experience any problems when using the instrument with batteries, contact Olympus. Observe the precautions described below when handling the battery. Otherwise, battery fluid leak, excessive heat generation, smoke, battery burst, electric shock and/or burns may result. Before use, thoroughly review the instruction manuals for the battery and battery charger to fully understand the information contained in them, and observe their instructions during use.



DANGER

- Use only the specified IB-1 battery and BCS-1 battery charger.
- Do not allow connectors to become shorted.
- Do not attempt to apply solder directly to a terminal.
- Do not interconnect the electrodes of the battery with metal, or carry or store the battery together with metal objects.
- Do not connect the battery directly to a power outlet or the cigar lighter of an automobile.
- Do not immerse the battery in fresh or sea water, or allow the battery to get wet.
- Do not throw the battery into fire or subject it to heat.
- Do not attempt to open or modify the battery.
- Do not pierce the battery, hit it with a hammer, or step on it.
- Do not subject the battery to strong impact.
- Do not use or leave the battery where it is exposed to direct sunlight, in a closed automobile in the sun, near a heater, etc.
- Fluid leaking from the battery can cause loss of sight if it gets into your eyes. Flush your eyes with tap water or other clean water without rubbing. Contact a physician immediately.
- Do not use the battery charger outdoors.
Otherwise, electric shock might occur, or smoke emission and fire might occur, causing damage to the charger. The battery charger is designed for indoor use.



WARNING

- Do not cover the battery charger with clothing, bedding, or other material while charging.
- After charging is complete, always be sure to unplug the battery charger's power plug from the electrical outlet.
- Immediately unplug the battery charger and stop using it at the first sign of heat generation, abnormal odor, abnormal noise, smoke, or any other abnormality.
Contact Olympus.
- If the battery charger cannot complete battery charging in the specified recharging time, stop trying to recharge the battery.
- Do not use a battery if it shows any irregularity such as fluid leak, discoloration, deformation or other abnormality.
Immediately request servicing.
- Should the battery fluid get onto your skin or clothing, immediately rinse with tap water or other clean water.
Otherwise, a skin injury may result. Contact a physician for treatment if necessary.
- Do not allow the battery compartment to become deformed and never put any foreign object into it.

-
- Do not allow metal or water, or any other fluid to get into the battery compartment or onto the battery terminals.
Should any foreign object enter the main unit, remove the battery and disconnect the AC adapter, and immediately contact Olympus.
 - Do not use a commercially available travel converter with the battery charger. Otherwise, the battery charger may be damaged.
 - Do not remove the battery as soon as possible after using the instrument for a long time.
Heat generated by the battery creates the risk of burn injury.
 - Do not leave the battery in a location subject to moisture, water leak or extremely high or low temperatures.
 - Do not touch the battery terminals while your hands are wet.
 - If you do not plan to use the battery for a long time, remove it from the main unit and store it in a dry place.
Otherwise, battery fluid leak and heat build-up may result in a fire or injury.
 - Keep the battery out of the reach of small children.



CAUTION

- If you are experiencing problems loading the battery, do not try to force it in.
Check the orientation of the battery and check the terminals for abnormalities. Trying to force the battery into the compartment may cause malfunction.
- If you are having problems removing the battery from the instrument, do not apply undue force.
Contact Olympus.
- When disposing of a battery, be sure to do so in accordance with all local laws, rules, and regulations.
Before disposing of a battery, check your local laws, rules, and regulations and follow them accordingly.



NOTE

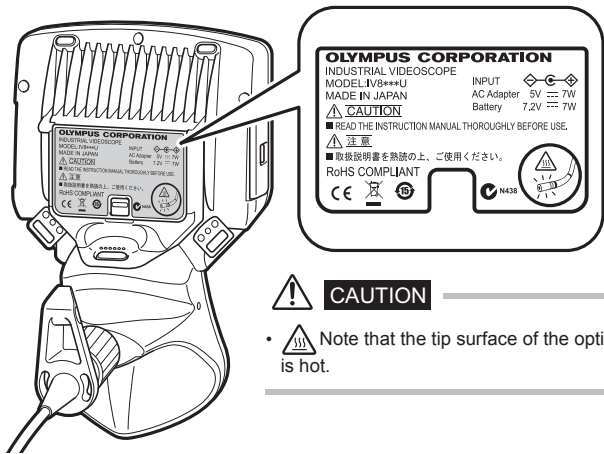
- Be sure to recharge the battery before using it for the first time after purchase or after it has not been used for a long period.
 - In general, the battery performance drops as the ambient temperature drops. Note that the battery performance degraded due to low temperatures recovers when the temperature rises to a normal level.
 - Contamination of battery electrodes with sweat or oil will cause contact failures. When the battery is dirty, wipe it clean with a dry cloth before use.
 - A full charger will provide approximately 90 minutes (generally speaking) of continuous operation. Actual operating time depends on the charging method, the operating environment, and the instrument's settings. Preparation of multiple spare batteries is recommended when long hours of battery-powered operation are expected. The battery charging time is normally about three hours and 30 minutes (generally speaking).
 - Recommended temperature range for Li-ion battery operation.
 - Discharging (using main unit) : -10°C to 40°C
 - Charging : 0°C to 40°C
 - Storage : -20°C to 35°CUsing the battery under a temperature outside the above temperature ranges will result in degradation of its performance and service life. When storing the battery, be sure to remove it from the main unit.
 - The battery is a consumable item.
 - The battery cannot be charged using the instrument. For information on charging the battery, refer to the manual that came with the battery charger.
-

Main unit rating plate/caution plate

The safety ratings, cautions, and serial number are on stickers on the battery cover and in the battery compartment.

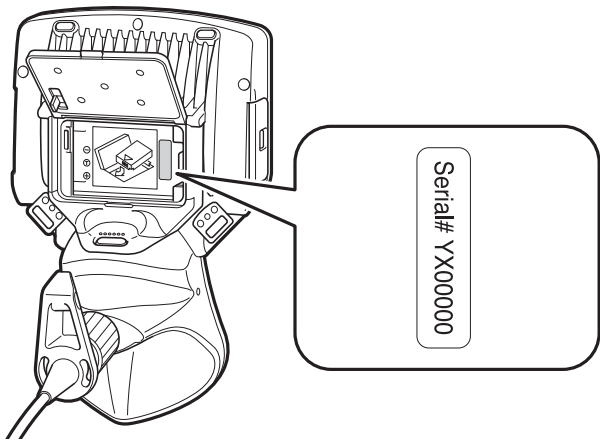
If labels are missing or if their contents are illegible, contact Olympus.

■ Rating and caution plate



- CAUTION**
- Note that the tip surface of the optical adapter is hot.

■ Serial number



1 Unpacking

1.1 Unpacking the instrument

When unpacking the instrument, check to make sure that all of the items listed below are included. Should anything be missing or damaged, contact your original vendor or Olympus.

Name	Count
IPLEX UltraLite (main unit)*	1
SD card	1
AC adapter	1
AC power cord	3
3P-2P adapter (For Japan only)	1
USB cable	1
Optical adapter case	1
Strap	1
Lens cleaning kit (cotton swab, brush)	1
Tip cap (4-mm type or 6-mm type)	1
Insertion tube fastening belt	1
Instructions (this document)	1
Return Request Card (For Japan only)	1
Warranty Registration Card (For Japan only)	1
Carrying case (compact zipper case)	1

* Refer to the label with packing instructions on the inside of the top lid of the carrying case for instructions on how to pack the instrument in the carrying case.

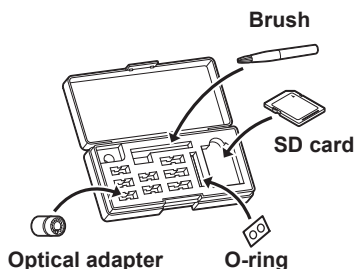
■ Optical adapter case

The following items are stowed in the optical adapter case.

- Optical adapter
- O-ring
- SD card
- Lens cleaning kit brush

Stow these items in the optical adapter case for storage when they are not in use.

The figure to the right shows the locations where each item should be stowed.

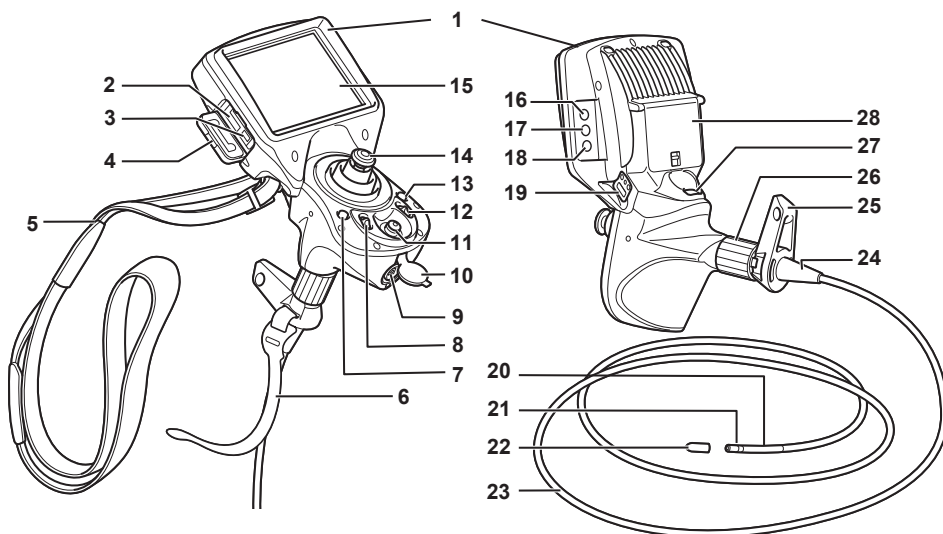


About options

Refer to "System chart" (P. 44) for information on options.

2 Nomenclature

2.1 Main unit/insertion tube nomenclature



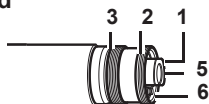
No.	Name	No.	Name
1	Main unit	15	LCD monitor
2	SD card slot	16	POWER button ()
3	USB connector	17	ROTATE button ()
4	SD card cover	18	LIGHT button ()
5	Strap	19	Strap holder
6	Insertion tube fastening belt	20	Angulation section
7	VIEW button*	21	Distal end
8	BRT lever	22	Tip cap
9	AC adapter connector	23	Insertion tube
10	AC adapter connector cap	24	Bend stopper
11	ENT/MENU joystick*	25	Insertion tube holder
12	ZOOM lever*	26	Angulation lock ring
13	LIVE button	27	FRZ/REC button*
14	Joystick	28	Battery cover

* The functions of these buttons may be different when they are long-pressed. In this manual, the term "short-press" is used to indicate pressing a button for a short duration, while "long-press" means holding down a button for at least one second.

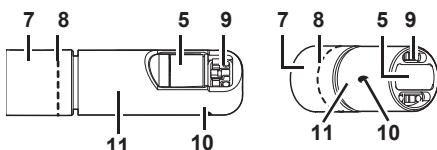
2.2 Distal end/optical adapter nomenclature

4-mm type

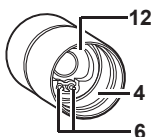
● Distal end



● Optical adapter

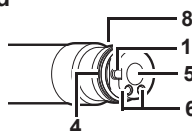


● Optical adapter internal view

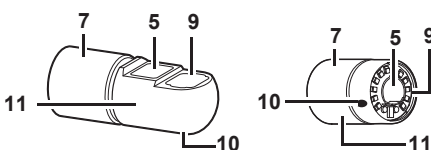


6-mm type

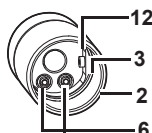
● Distal end



● Optical adapter



● Optical adapter internal view

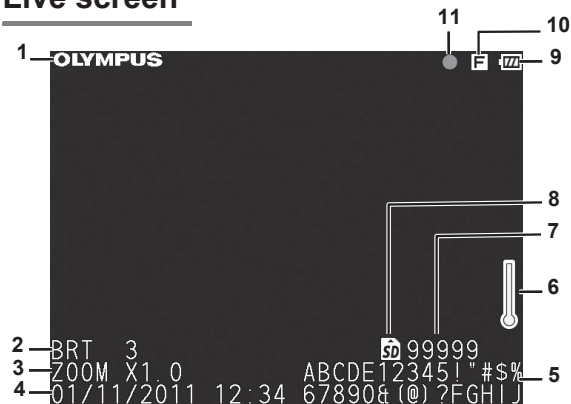


No.	Name	No.	Name
1	Optical adapter positioning cut surface	7	Nut
2	First screw thread	8	O-ring
3	Second screw thread	9	Illumination
4	Connecting screw thread	10	Index
5	Objective lens	11	Product abbreviation*
6	Electrode	12	Positioning pin

* For information about the product abbreviation, see the optical adapter instruction manual.

2.3 LCD monitor nomenclature

Live screen



Thumbnail screen



Retrieve screen



No.	Name
1	Logo
2	Brightness level
3	Zoom level
4	Date/Time
5	Title
6	Temperature indicator
7	Number of images that can be recorded
8	SD card icon
9	Battery indicator
10	Freeze indicator
11	Movie recording indicator
12	Folder name
13	File name
14	Remaining media capacity
15	Movie image indicator
16	Mark



NOTE

- The displayed title is the title that was entered on the Live screen the last time the system was used.
- Should you notice any dirt, stains, or other abnormalities on the LCD monitor, see "6 Storage and maintenance" (P. 33).

3 Pre-observation/pre-operation preparation and inspection

Be sure to finish the preparation and inspection work described in this chapter before using the instrument. At the first sign of any abnormality, immediately stop using the instrument and perform the required actions as described in "7 Troubleshooting" (P. 36).

Inspections are not only required before use, but should be conducted periodically.



CAUTION

- Make sure the instrument is turned off before performing pre-observation and pre-operation preparation and inspection.

3.1 Pre-observation preparation

1 Remove the instrument from its carrying case.

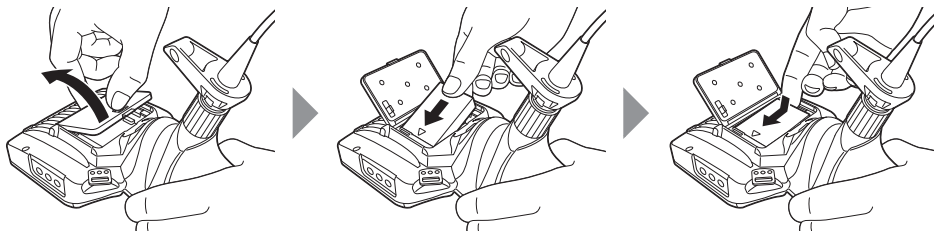
2 Preparing the power supply.

When using the battery (See P.12)

When using the AC adapter (See P.13)

Preparing the power supply

■ Using the battery



Use your finger to pull the battery cover lock and open the cover.

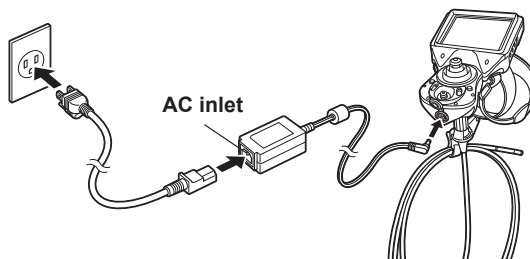
Noting the orientation of the battery, insert it terminals first into the compartment and then press down until you hear it click into place. After the battery is firmly in place, close the battery cover.

● Removing the battery

Insert the tip of your finger into the depression on the right side of the battery and lift it up while pushing on the left side with your finger to remove it.



■ Using the AC adapter



After connecting the provided AC power cord to the AC inlet of the AC adapter, plug the plug end of the AC power cord securely into a 3P power outlet.



CAUTION

- Always grasp the plug when unplugging it from the electric outlet. Pulling the cord creates the risk of wire breakage and other malfunction.

3.2 Pre-operation preparation

- 1 Turn on power. (See P.14)
- 2 Check the remaining battery level. (See P.14)
- 3 Select the display language (initial settings). (See P.28)
- 4 Configure date and time settings (initial settings). (See P.28)
- 5 Attach the optical adapter. (See P.14)
- 6 Check the illumination of the distal end. (See P.15)
- 7 Adjust white balance. (See P.27)
- 8 Check the angulation operation of the insertion tube. (See P.15)
- 9 Install the tripod adapter (when using a tripod). (See P.16)
- 10 Secure the insertion tube to move the instrument to another location. (See P.16)
- 11 Conduct a pre-operation inspection. (See P.17)

Turning on power

Hold down the POWER button (⏻) for at least 3 seconds to turn on power.

Display screen and menu operations become enabled about 3 seconds after the POWER button (⏻) is pressed.

■ Turning off power

Hold down the POWER button (⏻) for at least two seconds.

Checking the remaining battery level

When operating the instrument under battery power, an indicator in the upper right corner of the screen shows remaining battery power. The table below shows general guidelines for remaining battery power.

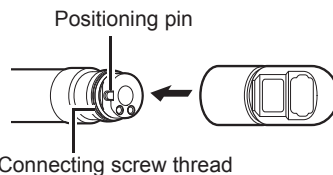
Indicator	Battery condition
	Battery power is sufficient (100% to 60%).
	Battery power is low (60% to 10%).
 *1	Battery power is almost depleted (10% to 5%).
 *1	Battery power is close to being depleted. Charge the battery or replace it with a charged battery (5% to 0%).

*1 Do not perform any image recording or deletion operation while this indicator is displayed. If power runs out during these operations data could be corrupted.

Attaching the optical adapter

- 1 Positioning the optical adapter with the distal end so they are directly opposite each other, carefully insert the optical adapter into the distal end.**

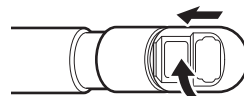
Example: For the 6-mm type



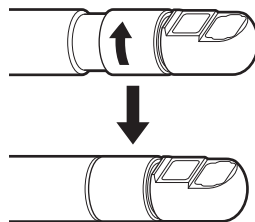
- 2 Turn the optical adapter nut clockwise until the first screw thread passes over the connecting screw thread.**



- 3 Once past the first screw thread, turn the optical adapter clockwise while pushing gently until it fits into the positioning cut surface on the distal end and can be turned no further.**



- 4** Turn the nut of the optical adapter clockwise until the second screw thread is screwed onto the connecting screw thread. Tighten the nut until it stops.



■ Removing the optical adapter

To remove the optical adapter, repeat the above attachment steps in reverse order.

■ Optical adapter attachment and detachment messages

Attachment or detachment of the optical adapter is automatically detected and indicated by a message.

- Attachment
OPTICAL ADAPTER IS ATTACHED.
- Detachment
OPTICAL ADAPTER HAS BEEN DETACHED.

Also, if the screw of the nut of the optical adapter is loose, a detached message is displayed.

Checking the illumination of the distal end



CAUTION

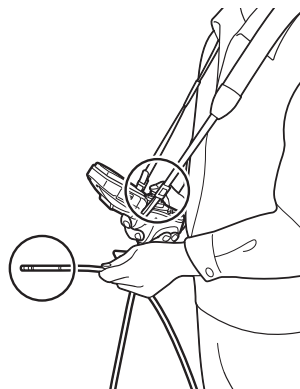
- The Illumination emitted from the distal end can heat nearby objects and cause them to ignite. Always turn the LIGHT button (☼) OFF when the instrument is not in use.
- If the illumination light does not light when you push the LIGHT button (☼), the optical adapter may not be attached correctly. There is a risk that the optical adapter may fall off, refer to "Attaching the optical adapter" (P. 14) to attach it correctly.

Attaching the optical adapter to the distal end automatically turns on illumination.

Checking the angulation operation of the insertion tube

Extend the insertion tube straight out and operate the joystick to check for smooth angulation section operation.

Angulation movement matches the angle and direction of joystick movement.

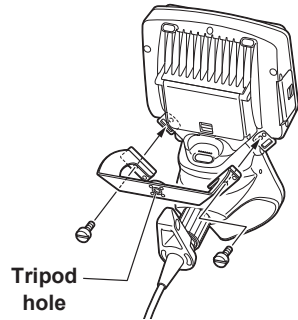


Attaching the tripod adapter

Attach the tripod adapter to the instrument to use a tripod to do observations.

Perform the following steps to install the tripod adapter.

- 1** Check the orientation of the tripod adapter (as shown in the illustration on the right).
- 2** Screw the screw on the tripod adapter into the screw hole on the strap holder to attach it.
- 3** Screw the screw into the tripod hole on the tripod adapter to attach it.



Securing the insertion tube to move the instrument to another location

The insertion tube can be coiled with the insertion tube fastening belt when moving the instrument to another observation location.

After coiling the insertion tube, wrap it with the insertion tube fastening belt near the insert tube bend stopper.

Transport the instrument by holding the main unit or by hanging it from the strap.



Holding the main unit



Hanging from the strap

Stow the instrument in its carrying case when moving or transporting it over long distances.



CAUTION

- Never dangle the instrument from the insertion tube to moving it.
- After stowing the instrument in its carrying case for transport, check to make sure that the carrying case cover is closed.

3.3 Pre-operation/post-operation inspections



CAUTION

- The distal end may become hot due to illumination or internal heating by electrical parts, etc. Before attaching or detaching the optical adapter, turn the LIGHT button (☀️) off and wait until the distal end is cooled down. Especially after use in high-temperature environments, touching the distal end immediately after turning off light creates the risk of burn injury.
- When inspecting the insertion tube, be sure to hold it at a point behind the angulation section. Otherwise, the angulation section may be damaged.
- Also be sure to check the inspection items after using the instrument.

Inspection location	Item	If abnormality is discovered
Overall	☐ Any dirt, sand, or other foreign matter on the insertion tube, battery cover, SD card cover?	See "6 Storage and maintenance" (P. 33).
	☐ Any cracks, scratches, or other defects to the insertion tube, battery cover, or SD card cover?	Replacement required. Contact Olympus.
	☐ Any irregularities such as damage to or deformation of the exterior material, buttons, joysticks, or levers?	
Insertion tube, angulation section, distal end	☐ Any looseness in materials other than the angulation section?	See "6 Storage and maintenance" (P. 33).
	☐ Any dirt or water droplets on the objective lens or electrodes of the distal end? Continued use in this condition creates the risk of damage to the optical adapter and/or distal end.	
	☐ Any build up of dirt on the optical adapter positioning surface or threads of the distal end?	
	☐ Any distal end deformation or looseness, or unusual connecting screw wear? Never use the instrument while there is any looseness on the distal end. Doing so creates the risk of loose parts falling into the inspection object.	
O-ring	☐ Is the O-ring missing, broken, etc.? An O-ring that is misaligned or broken can allow water or other liquid to get into the joint between the distal end and optical adapter, creating the risk of malfunction and damage. In some cases, the illumination does not light.	

Inspection location	Item	If abnormality is discovered
Optical adapter	☐ Any dirt or water on the inner or outer of the objective lens surfaces or the inner electrodes? Using the optical adapter inner surface electrodes while dirt or water is present can damage the optical adapter or the distal end. Failure to clean electrodes properly can result in illumination failure.	See "6 Storage and maintenance" (P. 33)
	☐ Make sure there are no deformities or foreign objects in the threads of the screws of the optical adapter. Note that insufficient cleaning can result in a loss of water tightness between the optical adapter and the distal end.	
	☐ Any looseness in optical adapter components? Never use the optical adapter if any components are loose. Otherwise, a loose part might fall into the inspection object.	
LCD monitor	☐ Any surface cracks or other abnormalities?  NOTE The LCD monitor is manufactured based on precision technologies. The LCD monitor may contain pixels that do not light (visible as black dots) or light permanently (visible as bright dots). This does not indicate a defect or malfunction of the product.	Replacement required. Contact Olympus.
	☐ Any fingerprints on the screen or other soiling?	

4 Basic operation

4.1 Viewing an observation object



WARNING

- The distal end will be hot immediately after use in a high-temperature environment. Do not touch it directly. Doing so creates the risk of burn injury.

1

Turn on optical adapter illumination.

2

While watching the display screen, insert the insertion tube into the observation object.

Insert carefully while checking the insertion direction.

3

Use the joystick to perform angulation operations and observe the applicable locations on the display.

Be careful not to apply excessive pushing force, twisting or tension to the insertion tube.

4

Lock the angulation section angle and direction (angulation lock) and perform observation.

When the angulation section is at the desired angle and direction, rotate the angulation lock ring to align the "L" and "-" marks. Fine adjustment of the angulation angle can be performed while angulation is locked.

5

While watching the display screen, carefully withdraw the insertion tube.

If angulation is locked, first rotate the angulation lock ring to align the "F" and "-" marks to unlock it before removing the insertion tube.



CAUTION

- Should any of the following messages appear during observation, immediately stop observation, carefully withdraw the insertion tube, and perform the required actions as instructed in "Error messages" (P. 36).
 - OVER CURRENT (ADAPTER). PLEASE TURN OFF THE POWER AND CLEAN THE ELECTRODE.
 - HIGH TEMPERATURE (DISTAL END). PLEASE IMMEDIATELY PULL OUT THE INSERTION TUBE.
- Should you sense any abnormality, do not try to force the operation and carefully withdraw the insertion tube. Note the following precautions when withdrawing the insertion tube.
 - Do not try to withdraw from the observation object while angulation is locked or while the angulation section is bent.
 - If the insertion tube becomes caught on something during withdrawal, rotate the control unit gently while continuing the withdrawal.
- A yellow temperature indicator will appear on the display if the ambient operating temperature of the distal end reaches approximately 80°C. Note that this indicates that the upper limit of the ambient operating temperature is being approached.
- The battery indicator flashes yellow if the battery overheats. Note that this indicates that the upper limit of the operating temperature is being approached.



NOTE

- Increasing the insertion tube looping amount (bending amount) decreases the maximum angulation angle limit of the angulation section. Keep the insertion tube as straight as possible to get the best operations from the instrument.
- Angulation tends to be difficult to achieve under low temperatures.
- The LCD monitor may not display data normally when the instrument is used in an environment where temperatures are below 0°C. Use a heater to warm the area before operation. The amount of screen noise may increase under high ambient temperatures.

4.2 Adjusting the image display

Still image display (Freeze)

- 1 While a live image is displayed, short-press the [FRZ/REC] button.

This will freeze the observation screen image and display the freeze indicator () in the upper right corner of the LCD monitor. Do not insert or withdraw the insertion tube while an image is frozen.

- 2 The display image can be unfrozen by a short-press of the [FRZ/REC] button or the [LIVE] button.



NOTE

- Freezing an image that contains high-speed action may result in a blurred image.

Enlarging an image (Zoom)

The display image can be zoomed for an enlarged view of the observation object.

Each upward press of the [ZOOM] lever enlarges the image five times.

To zoom back to the original image size, press the [ZOOM] lever downwards.

During a zoom operation, [ZOOM] will appear on the screen along with a value indicating the zoom level (for about three seconds).



NOTE

- Images are zoomed using "digital zoom". As a result, the image may become slightly coarse at higher zoom factors.

Adjusting image brightness

■ Automatic brightness adjustment with the [BRT] lever

The [BRT] lever can be used to adjust brightness by changing the overall brightness of a live image during observation.

While a live image is displayed, press the [BRT] lever upwards to increase overall image brightness, or downwards to decrease it.

Performing a brightness adjustment operation will cause a value indicating the current brightness level to appear on the screen for about three seconds.

● Displaying a high-sensitivity image (monochrome boost)

The live image becomes monochrome (monochrome boost) during high-sensitivity image display. This function is effective to provide a higher level of brightness than normal when viewing a very dark subject, etc.

While a live image is displayed, you can switch to high-sensitivity image display by pressing the [BRT] lever upwards until [BRT] (brightness level) reaches its maximum setting (Level 10). Note that the image noise may increase under certain observation conditions.

4.3 Recording images

Still images and movie images can be recorded during observation. Data can be stored on the provided SD card.
Use either the provided SD card or a recommended Class 6 or higher SDHC card for storage. Use of SDXC cards is not supported.

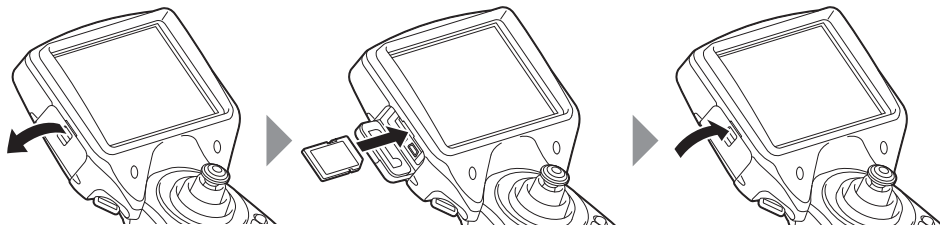
Loading an SD card

Format the SD card for recording images on the instrument before using it. For details about formatting, refer to "SD card formatting (initialization)" (P. 28).
The following table shows the size of a single image and the approximate numbers of images that can be recorded on an SD card.

Recording format	Approximate single image size	Approximate image capacity (1 GB)
Still images	300 KB	3,400 images
Movies (per sec.)	500 KB	30 minutes

Image recording settings must be configured using menu operations. See "5.1 Performing menu operations" (P. 26) and "5.2 Using the live screen/freeze screen" (P. 27).

■ Loading an SD card



Use your finger to pull the SD card cover lock and open the cover.
Noting the orientation of the SD card, insert it into the slot until you hear it click into place. Next, close the SD card cover.



CAUTION

- If the SD card does not slide smoothly into the slot, it could mean that it is not aligned correctly. Do not try to force the card into the slot. Check its orientation.

■ Specifying the image recording format

To record the date, time, title, logo, and other on-screen information onto the image being recorded, press the [ENT/MENU] joystick while a live screen is displayed. On the menu that appears, select "SETUP" and then "PRINT SCREEN ON/OFF". Next, change the "PRINT SCREEN ON/OFF" setting to "ON". (See P.27.)



NOTE

- Replaying a still image that has the date, title, and other information recorded on it may result in overlapping of date, time, title, logo, and other text. This is not a malfunction.

■ File names

File names are generated and assigned automatically as images are stored on an SD card. You can change a file if you want (up to 30 alphanumeric characters and symbols).

IV0?????.***

File name extension

".JPG" for still image files, ".AVI" for movie files.

5-digit file name serial number

The file number is assigned sequentially from 00001 to 99999.



NOTE

- You can use the FILE NAME MARK menu to specify addition of the letter "_A", "_B", or "_C" at the end of image file names. Use this function to categorize image files.

Recording a still image

- 1 While a live image is displayed, short-press the [FRZ/REC] button.**
This freezes the image.
- 2 While the freeze screen is displayed, long-press the [FRZ/REC] button again.**
This records the still image.
At this time the screen will momentarily go black, and then the freeze screen will reappear.

Recording a movie image

- 1 While a live image is displayed, press the [FRZ/REC] button.**
After a still image is recorded, the movie image recording confirmation window will appear.
- 2 Select "YES" and then short-press the [ENT/MENU] joystick.**
This starts movie image recording. A movie recording indicator flashes on the LCD monitor while movie recording is in progress. If you select [NO] in the moving image confirmation window, only the still image is recorded but the moving image is not recorded.
- 3 To stop movie recording short-press the [FRZ/REC] button.**
The flashing movie recording indicator disappears from the screen when movie recording is complete.

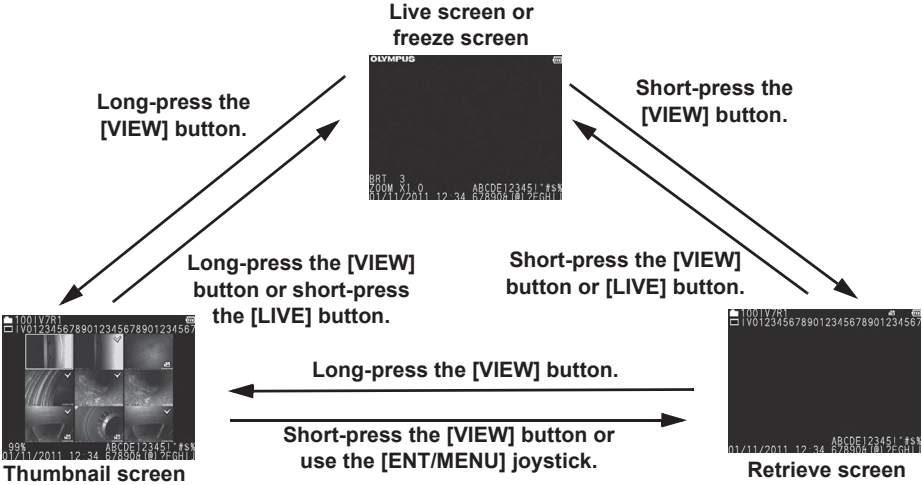


NOTE

- Never attempt to insert or remove an SD card while movie recording is in progress. Doing so will cause movie recording to stop and an error message to appear on the display.
- Recording stops automatically whenever the SD card becomes full or when the file size reaches 2 GB. An empty 1 GB SD card has enough capacity to record approximately 30 minutes.
- Short-pressing the [VIEW] button stops movie recording and displays the retrieve screen, long-pressing the [VIEW] button stops movie recording and displays the thumbnail screen.

4.4 Replaying an image

Recorded images can be displayed using either of two screen views: a full-screen view of a single image (retrieve screen) or a multi-image view of thumbnail images (thumbnail screen). The thumbnail screen shows multiple images at a single glance, which makes it useful when finding a particular image among a large group of images. Check to make sure an SD card is loaded before starting playback.



Playing back on a full-screen view (retrieve screen)

- 1 While the live screen, freeze screen, or thumbnail screen is displayed, short-press the [VIEW] button.**

This will display a full-screen view of the newest recorded image.
- 2 Switch the image you want to play back.**

Use the [ENT/MENU] joystick to switch the image you want to play back.

[ENT/MENU] joystick left operation

Scrolls from the currently displayed image to the image chronologically before it. When images are sorted in descending order, performing this operation when at the last image will return to the first image.

[ENT/MENU] joystick right operation

Scrolls from the currently displayed image to the image chronologically after it. When images are sorted in ascending order, performing this operation when at the last image will return to the first image.
- 3 Rotate the image 180° and play it back. (Rotate)**

Press the [ROTATE] button to rotate the image 180°. This feature comes in handy when the instrument is on a desk or table in an upside down position.
- 4 Short-press the [LIVE] button or [VIEW] button to return to the live screen.**

Multi-image view (thumbnail screen)

The thumbnail screen shows multiple recorded movie and still images on a single screen (nine images per screen).

You can use the thumbnail screen to search for a desired image, or to select multiple images to move them or delete them.

1 While the live screen, freeze screen, or retrieve screen is displayed, long-press the [VIEW] button.

This will display a multi-image view of recorded images (up to nine images per screen).

A movie image is indicated by the movie image indicator ().

■ To select a thumbnail

Move the [ENT/MENU] joystick up, down, left or right to move the selection boundary around the screen.

The thumbnail where the selection boundary is located is the currently selected image.

■ To play back an image

Select the image you want to play back and then short-press the [ENT/MENU] joystick.

This starts full-screen view playback of the selected image.

■ To select multiple images to move or delete them

Selecting an image and then pressing the [BRT] lever upwards will put a check mark (✓) in its upper right corner to indicate that it is selected. After selecting all of the images you want this way, you can then perform the required menu operations to move or delete them.

● To select all thumbnails

Pressing the [BRT] lever downward will put a check mark (✓) in its upper right corner of all of the thumbnails.

● To remove a check mark

From a specific image only

Select the image whose check mark you want to remove, and then press the [BRT] lever upwards.

From all thumbnails that have check marks (✓)

Press the [BRT] lever downwards.

2 Rotate the image 180° and play it back. (Rotate)

Press the [ROTATE] button to rotate the image 180°. This feature comes in handy when the instrument is on a desk or table in an upside down position.

3 Short-press the [LIVE] button or long-press the [VIEW] button to return to the live screen.

4.5 Using images on a PC

Use the provided USB cable to import recorded images directly from the instrument to your computer.

1 On the live screen, use the SETUP menu to select [PC] to configure the instrument's PC settings.

2 Use the USB cable to connect the instrument to a PC that is running.

On the PC, click the files you want to play.

3 Shutdown operation of the computer.

Safely remove hardware from the PC and then turn the instrument off.



CAUTION

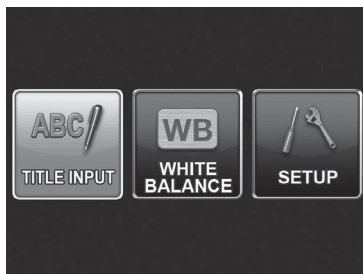
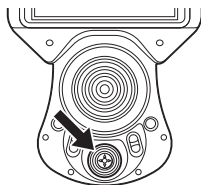
- Connect only the provided USB cable to the USB connector for connection of a PC only. Otherwise, malfunction might occur.
 - The instrument will not display the live screen while recorded images are being displayed on a PC screen.
-

5 Menu operations and functions

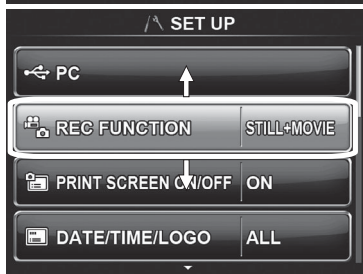
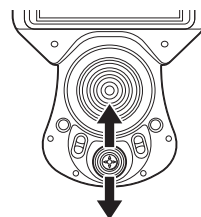
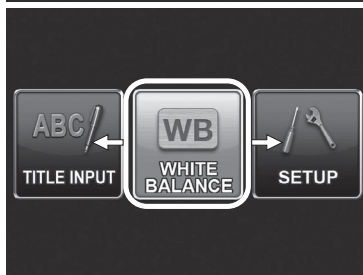
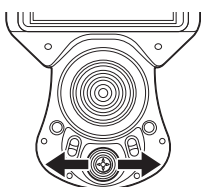
5.1 Performing menu operations

- 1** Long-press the [ENT/MENU] joystick.

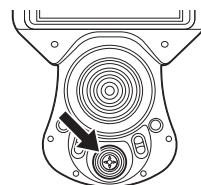
This displays the main menu.



- 2** Tilt the [ENT/MENU] joystick up, down, left or right to select the menu item you want to execute.



- 3** Short-press the [ENT/MENU] joystick to apply the setting and return to the screen in which the main menu was displayed.



NOTE

- Long-pressing the [ENT/MENU] joystick while doing menu operations, returns to the screen in which the main menu was displayed.

5.2 Using the live screen/freeze screen

Menu display and functions

The settings described in the table below can be configured using the live screen/freeze screen menu.

*: Initial default

Available settings	Menu
Title input A title can be displayed in the live screen and in registered images. Input can be up to 30 characters. See "Inputting a title" (P. 29).	TITLE INPUT 
White balance adjustment (Live screen only) Specifies whether to perform white balance. - CANCEL : Do not adjust. - EXECUTE : Adjust. After changing the optical adapter, capture an image of a white object, such as a piece of paper, from a distance of 50 to 60 mm.	WHITE BALANCE 
The following menu is in the "SETUP" menu.	
PC USB connection Specifies whether to establish a USB connection with a PC. Specifying USB connection enables import of instrument images to a PC. - CANCEL : Do not configure PC connection settings. - EXECUTE : Configure PC connection settings.	PC 
[FRZ/REC] button image type setting Specifies the type of image that is recorded when a record operation is performed with the [FRZ/REC] button. Long-pressing the [FRZ/REC] button performs one of the following operations. - STILL+MOVIE*: - Live screen :Records still image and movie. - Freeze screen :Records still image only. - STILL ONLY: - Live screen :Records still image only. - Freeze screen :Records still image only.	REC FUNCTION 
Date, title, and other information recording Specifies date, time, title and logo and other information included on the display should be recorded in images. - ON : Record information. - OFF* : Do no record information.	PRINT SCREEN ON/OFF 

Available settings	Menu
Display information setting Specifies whether display information (date and time, title, etc.) should be shown on the LCD monitor. This setting can also be used to specify the type of information to be displayed. • ALL : Show the date, time, title, "OLYMPUS" logo, zoom level, and brightness level. • DATE/TIME/LOGO: Show the date, time, title, and "OLYMPUS" logo. • DATE/TIME : Show the date, time, and title. • OFF : Hide information.	DATE/TIME/ LOGO 
Letter appending to the end of image file names Specifies whether a letter should be added to names assigned to recorded image files. This feature helps to categorize image files. • ON : Append letter. You can select from among "_A", "_B", and "_C". Selecting "ON" displays a dialog box for selecting the letter to be appended to each image file name. • OFF* : Do not append letter.	FILE NAME MARK 
Specifies a folder for image recording and playback Specifies a folder for image recording and playback. The data of images that are recorded is saved in the specified folder. During playback, the recorded data in the specified folder is displayed.	CHANGE FOLDER 
SD card formatting (initialization) • CANCEL : Do not format the card. • EXECUTE : Format the card.  CAUTION • Never remove the SD card while formatting is in progress. • Formatting an SD card deletes all of its data.	MEDIA FORMAT 
Date and time settings Configures date and time settings. See "Setting the date and time" (P. 31).	DATE TIME 
Display language selection Specifies the language used for menus and messages. English and other languages are supported. See "Changing the display language" (P. 31).	LANGUAGE 

Inputting a title

The following are the two methods that can be used to input a title.

- Input text from the on-screen keyboard
- Select a preset title

■ Input text from the on-screen keyboard



- 1 Select the input mode and then press the [ENT/MENU] joystick.
- 2 Select the buttons of the characters you want and then press the [ENT/MENU] joystick.

The characters you input appear in the title input box. Edit the text as required.

● To delete characters

- To delete a single character, move the cursor to it, select [DELETE], and then press the [ENT/MENU] joystick.
- To delete all input characters, select [CLEAR] and then press the [ENT/MENU] joystick.

● To input a space

Move the cursor to the location where you want to input the space, select [SPACE], and then press the [ENT/MENU] joystick.

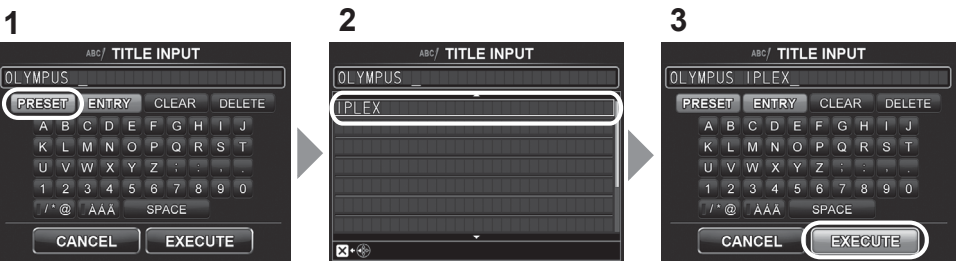
- 3 Select [EXECUTE] and then press the [ENT/MENU] joystick.

This displays the title you input on the LCD monitor.

■ Selecting a preset title for input

With this procedure, you select a preset character string and use it to input a title.

For information about how to register frequently used text strings, see "Registering a character string as a preset title" (P. 30).



- 1 Select [PRESET] and then press the [ENT/MENU] joystick.

This displays a list of preset titles. To cancel preset title selection, press the [ENT/MENU] joystick left or right to close the list screen.

2 Select the preset title you want from the list and then press the [ENT/MENU] joystick.

The text string you select appears in the title input box.
Repeat steps 1 and 2 to complete input of the title.



NOTE

- The preset title list has two pages. To change pages, select the text string in line 1 or line 7 of the currently displayed page and then tilt the [ENT/MENU] joystick upwards or downwards.

3 Select [EXECUTE] and then press the [ENT/MENU] joystick.

This displays the title you selected on the LCD monitor.

Registering a character string as a preset title

After you register commonly used character strings to favorites, you can recall them when you are inputting titles. You can register a maximum of 14 character strings to preset titles.



1 Input the character string you want to register into the title input box.

For details about inputting, see "Inputting a title" (P. 29).

2 Select [ENTRY] and then press the [ENT/MENU] joystick.

A list of preset titles is displayed.

To cancel preset title registration, press the [ENT/MENU] joystick left or right to close the list screen.



NOTE

- The preset title list has two pages. To change pages, select the text string in line 1 or line 7 of the currently displayed page and then tilt the [ENT/MENU] joystick upwards or downwards.

3 Select the line where you want to store the string and then press the [ENT/MENU] joystick.

The text string you input in the title input box is registered to preset titles.

Registering a preset title overwrites anything currently in the line you specify in the list. This means you can delete a preset title by performing the registration operation while the title input box is blank.

4 Press [ENT/MENU] joystick towards the left.

This closes the preset title list screen.

Changing the display language

Use the procedure below to select the language for menus and error messages that appear on the display.

SETUP > LANGUAGE > Select a language.



Selecting a language displays the message to let you know that the process is being performed. After the message disappears, LCD monitor contents will be in the language you selected.



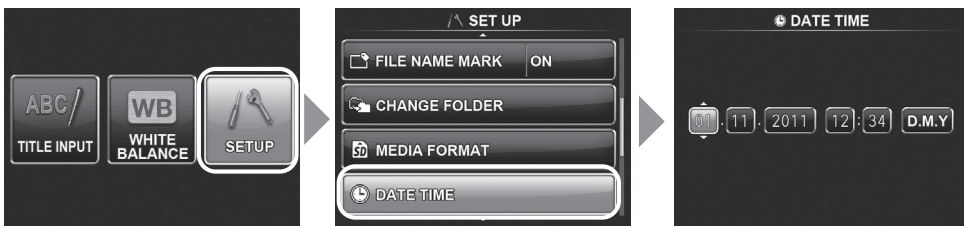
NOTE

- After the language setting is changed, it may take longer than normal for screen display functions to be performed. This does not indicate malfunction.

Setting the date and time

Use the procedure below to configure date and time settings.

SETUP > DATE TIME > Set DMY, H:M.



Be sure to set the correct date and time before using the instrument for the first time. Date and time information is shown on the display and is also recorded on the print screen. Data recording is also performed in accordance with date and time information.

5.3 Using the thumbnail/retrieve screens

Menu display and functions

The menu displayed on the thumbnail/retrieve screen can be used for the following settings.

Available settings	Button
Image delete • CANCEL : Do not delete image. • EXECUTE : Delete image. On the retrieve screen, the currently displayed image is deleted. On the thumbnail screen, the currently selected image or all images that are check marked (✓) are deleted.	DELETE 
Move image files to folder (Thumbnail screen only) Moves recorded images to a different folder. The currently selected image or all images that are check marked (✓) on the thumbnail screen are deleted.	MOVE FILE 
Rename file (Thumbnail screen only) Changes the name of a recorded image file (within 30 letters).	RENAME FILE 
Specifies a folder for image recording and playback (Thumbnail screen only) Specifies a folder for image recording and playback. The data of images that are recorded is saved in the specified folder. During playback, the recorded data in the specified folder is displayed.	CHANGE FOLDER 
Create folder (Thumbnail screen only) Creates a new folder. The initial default is "100IPLEX".	MAKE FOLDER 
Rename folder (Thumbnail screen only) Changes the name of a folder. (Name may be up to 30 characters, but only 8 characters appear on screen.)	RENAME FOLDER 



NOTE

- You can use only alphanumeric characters and symbols for folder and file names. Some symbols are unavailable for folder and file names also.
- To cancel a file move or rename folder operation, press the [ENT/MENU] joystick to the left.

6 Storage and maintenance

6.1 Replacing the battery

Though the battery life depends on the operating environment and frequency of use, replacement of the battery is recommended whenever the battery operation time becomes very short. Contact Olympus about changing the battery.

For details about how to load and remove the battery, see "Using the battery" (P. 12).



CAUTION

- Never use a battery other than the one specified by Olympus. Otherwise, failure of the instrument may not only lead to a malfunction but also a fire.
- Be careful not to leave any foreign objects in the battery compartment when replacing the battery. Otherwise, a fire or malfunction may result.

6.2 Replacing the O-ring

■ 6-mm type

Apply silicon grease to the spare O-ring that comes with the optical adapter and replace it.

■ 4-mm type

Contact Olympus.

6.3 Cleaning components

Cleaning the insertion tube

Dirt or other foreign matter on the insertion tube

Wipe with a clean soft cloth.

Dirty water, machine oil, or other liquid on the insertion tube

Wipe with a soft cloth or cotton swab, and then wash thoroughly with a piece of gauze or other material moistened with a neutral detergent. Next, use a clean, soft piece of soft gauze moistened with clean water, and then wipe the insertion tube dry of all moisture.



CAUTION

- Clean the insertion tube immediately after withdrawing the insertion tube. Leaving the insertion tube very dirty for long periods can cause it to become corroded.
- Do not use a hard cloth or hard brush for cleaning the insertion tube. Otherwise, the equipment may be damaged.
- Do not clean the optical adapter under running water. Otherwise, the equipment may be damaged.

Cleaning the distal end

Dirt or water droplets on the objective lens or electrodes of the distal end

Grasping the rigid portion of the distal end, use a clean, soft piece of gauze or a cotton swab to wipe off the dirt or water. You could also use the brush to brush away dirt and water. Best results may be obtained using a commercially available absolute ethanol or isopropyl alcohol.



Build up of dirt on the optical adapter positioning surface or threads of the distal end

Use the brush provided with the cleaning kit to brush away built up dirt.

Note that insufficient cleaning can result in a loss of water tightness between the optical adapter and the distal end.

Cleaning the optical adapter

Dirt or water on the inner and outer surfaces of the objective lens and the electrodes

Use a piece of clean, soft gauze or cotton swab to wipe off dirt and water. You could also use the brush to brush away dirt and water.

Cleaning dirt from the optical adapter outer surface while attached to the distal end

Grasping the rigid portion of the distal end, wipe the optical adapter. Best results may be obtained using a commercially available absolute ethanol or isopropyl alcohol.

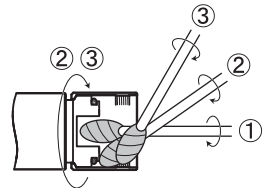


CAUTION

- Using the optical adapter electrodes while dirt or water is present may cause damage to the optical adapter or the distal end.
- Failure to clean electrodes properly can result in illumination failure.

Dirt on the inner surface of the optical adapter

Moisten a cotton swab with a commercially available absolute ethanol or isopropyl alcohol and continue cleaning until doing so leaves no dirt on the cotton swab. Clean in the sequence (1), (2), (3) as shown in the nearby illustration. Spin the cotton swab while cleaning. Also, for thorough cleaning, turn the optical adapter while doing (2) and (3).



CAUTION

- Note that insufficient cleaning can result in a loss of water tightness between the optical adapter and the distal end.
- Cleaning should be done periodically in order to maintain water resistance.

Cleaning the LCD monitor

LCD monitor viewing problems due to fingerprints and dirt

Wipe the LCD monitor with a soft cloth dampened with clean water. Next, lightly wipe it with a clean, dry cloth.



CAUTION

- Never use a chemically treated cloth or strong detergent, such as benzine or alcohol. Doing so may damage the surface of the LCD monitor.
 - Do not use a cloth that is hard, dirty, or has foreign matter on it. Doing so may damage the surface of the LCD monitor.
-

Cleaning the main unit

Dirty main unit

Wipe the main unit with a soft cloth dampened with clean water. Next, lightly wipe it with a clean, dry cloth. Also wipe all dirt, water, and other foreign matter from the battery cover, SD card cover, and the inside of the AC adapter connector.



CAUTION

- Do not rinse the instrument with running water. Otherwise, the equipment may be damaged.
-

6.4 Storage precautions

Store this product under normal room temperature and humidity.



CAUTION

- Never subject cables to severe bending, pulling, binding, twisting, or crushing forces. Do not allow a cable to be exposed to heat, which can melt its covering. Otherwise, cable might be damaged, which can lead to fire and electric shock.
-

- 1 Turn off power and remove the battery or unplug the AC adapter.**
- 2 Unlock the angulation lock and straighten the angulation section, then store it according to the label with packing instructions.**
- 3 Store the equipment on a level surface in a clean, dry and stable place.**

7 Troubleshooting



WARNING

- Never use the instrument if there is any abnormality. Otherwise, the instrument may malfunction and the user may also be injured fatally, critically or seriously.

Inspect the equipment as described in "3 Pre-observation/pre-operation preparation and inspection" (P. 12), do not use the equipment if there are any obvious malfunctions. Contact Olympus for repairs. Should even the slightest irregularity be suspected, do not use the instrument. Perform the actions described in "7.1 Troubleshooting guide" (P. 36). If the problem cannot be resolved by the described remedial action, stop using the instrument and send it to Olympus for repair.

7.1 Troubleshooting guide

Error messages

Message	Cause and recommended action
NO RECORDING MEDIA.	An SD card is not loaded. →Load an SD card and try again.
RECORDING MEDIA FULL.	The SD card is full. →Delete unneeded data to free up space or replace with a new SD card.
THIS IMAGE CANNOT BE RETRIEVED.	The image was not recorded with this instrument. →Only images recorded with this instrument can be displayed.
RECORDING MEDIA IS LOCKED. PLEASE UNLOCK.	The SD card is locked. →Unlock the SD card you are using and then replace it.
RECORDING MEDIA ERROR. PLEASE FORMAT THE RECORDING MEDIA.	The format of the SD card cannot be recognized. →Format the SD card on the instrument.
IMAGER ERROR. PLEASE TURN OFF THE POWER.	The self-check function activated and prompted termination of operation. →Stop inspection and turn the instrument off, then on again.
OPTICAL ADAPTER HAS BEEN DETACHED.	The optical adapter has detached. →Temporarily pause inspection and reattach the optical adapter. (See "3.2 Pre-operation preparation" (P. 13).)
OVER CURRENT (ADAPTER). PLEASE TURN OFF THE POWER AND CLEAN THE ELECTRODE.	An abnormality was detected in the distal end electrode. →Immediately withdraw the insertion tube from the observation object and turn off power. Clean the distal end and optical adapter electrode ("6.3 Cleaning components" (P. 33)) and reattach the optical adapter ("Attaching the optical adapter" (P. 14)).

Message	Cause and recommended action
HIGH TEMPERATURE (DISTAL END). PLEASE IMMEDIATELY PULL OUT THE INSERTION TUBE.	This message prompts you to stop inspection because the self-check function was triggered because the distal end was overheating. →Immediately withdraw the insertion tube from the observation object.  NOTE • This message appears before the atmospheric temperature of the distal end of the insertion tube reaches the maximum operating ambient temperature.
LOW BATTERY. PLEASE CONNECT TO THE AC ADAPTER OR TURN OFF THE POWER.	Battery voltage is low. →Stop all image recording, copy, and delete operation, SD card format operations, etc., and immediately replace the battery. Or you connect the AC adapter.
BATTERY TEMPERATURE IS HIGH. PLEASE CONNECT TO THE AC ADAPTER OR TURN OFF THE POWER.	Battery temperature up, self-check function activated. →Connect the AC adapter or turn off the power.
THE SPECIFIED FOLDER NAME ALREADY EXISTS. PLEASE CHOOSE ANOTHER NAME.	A folder with the same name as the one you are creating already exists. →Specify a different folder name.
THE SPECIFIED FILE NAME ALREADY EXISTS. PLEASE CHOOSE ANOTHER NAME.	A file with the same name as the one you are creating already exists. →Specify a different file name.

Common problems

Problem	Cause and recommended action
Illumination does not light.	The LIGHT button () is not on. →Turn on the LIGHT button (). The optical adapter is not attached properly. →Attach the optical adapter properly. Electrodes on the optical adapter or the insertion tube distal end are dirty. →Wipe with a clean piece of gauze or a cotton swab. Or use a brush to remove foreign matter ("Cleaning the optical adapter" (P. 34)). The LEDs on the distal end of the optical adapter are inoperable. →Replace the optical adapter with a new one.
The illumination is dim.	The optical adapter tip is dirty. →Wipe with a clean piece of gauze or a cotton swab. Extended use under high ambient temperatures causes decreased light emissions. →Replace the optical adapter with a new one.

Problem	Cause and recommended action
The optical adapter cannot be attached to the insertion tube.	A foreign object is stuck to the screws. →Wipe with a clean piece of gauze or a cotton swab. The optical adapter in use is not a designated optical adapter for this system. →Use the designated optical adapter. The installation procedure is not correct. →Reinstall using the correct procedure ("Attaching the optical adapter" (P. 14)).
The optical adapter cannot be removed from the insertion tube.	The nut of the optical adapter is rotated in the wrong direction. →Reinstall using the correct procedure ("Attaching the optical adapter" (P. 14)).
The system cannot be turned on.	The AC adapter or the battery is not connected. →Connect the AC adapter or the battery correctly. (See "Preparing the power supply" (P. 12).) The Power button is not on. →Turn on the main unit POWER button (). A non-designated AC adapter or battery is connected. →Use the designated AC adapter or battery.
The system cannot be turned off.	The main unit is damaged. →Remove the AC adapter or the battery from the main unit to turn off the power.
The image is not sharp.	The objective lens on the distal end or the optical adapter is dirty. →Wipe with a clean piece of gauze or a cotton swab. The optical adapter is attached improperly. →Attach the optical adapter properly.
The image brightness is not optimum.	The automatic brightness control is set erroneously. →Perform the [BRT] lever operation to configure the proper setting. The objective lens on the distal end or the optical adapter is dirty, or the illumination on the optical adapter distal end is dirty. →Wipe with a clean piece of gauze or a cotton swab. Extended use under high ambient temperatures causes decreased light emissions. →Replace the optical adapter with a new one.
Color reproduction is poor.	The white balance is set improperly. →Re-adjust white balance.
The image is noisy.	The automatic brightness control is set erroneously. →Perform the [BRT] lever operation to configure the proper setting.
Angulation cannot be returned to its original attitude.	The angulation lock is engaged. →Rotate the angulation lock ring to release the angulation lock.
Operation load for articulation is getting heavier.	Angle lock is engaged →Rotate the angulation lock ring to release the angulation lock.
All the functions stopped during motion image recording.	The SD card being used for image recording is not the one provided and is not one recommended by Olympus. →Remove the AC adapter or the battery from the main unit to turn off the power. →Use an SD card recommended by Olympus.

7.2 Requesting repair of this product



WARNING

- Olympus is not liable for any accidents or instrument damage that occurs as a result of repairs attempted by non-Olympus personnel.



CAUTION

- Olympus will not repair an instrument contaminated by noxious substances.
-

Contact Olympus before requesting repair of this instrument. Include a detailed description of the malfunction and the conditions under which it occurs when returning the instrument.

Malfunctions that occur during the warranty period are done at no charge according to the warranty agreement. Be sure to attach the warranty agreement when returning the instrument for repairs. Repair will be charged if the warranty agreement is not attached. The freight fees are paid by the user even if repairs are done free of charge.

8 Specifications

8.1 Operating environment

Operating temperatures

Insertion tube	In air : -25 to 100°C In water: 10 to 30°C
Other parts than above	In air : -10 to 40°C (Battery-powered operation) 0 to 40°C (AC adapter-powered operation)

Operating atmospheric pressure

Insertion tube	In air : Normal pressure (1,013 hPa) In water: 1,013 to 1,368 hPa
Other parts than above	In air : Normal pressure (1,013 hPa)

Operating environment humidity

All parts	15 to 90% (relative humidity)
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Liquid resistance

Insertion tube	No trouble when exposed to machine oil, light oil or 5% saline solution.
Other parts than above	

Waterproofing

Insertion tube	Waterproof construction. Can be used underwater with the optical adapter attached.
Other parts than above	Water resistant proof construction. Use in water is not supported. The instrument is not water-resistant if the battery cover, SD card cover, or AC adapter connector cap is open.



CAUTION

- Meeting operating environment specifications does not constitute any guarantee against damage to or malfunction of this equipment.
- Use AC adapter and battery charger indoors (normal temperature).

8.2 Other specifications

Optical system

For optical adapter specifications, see "8.3 Optical adapter specifications" (P. 43).

Distal end

Outer diameter	V84 Series: ϕ 4.0 mm V86 Series: ϕ 6.0 mm
Distal end rigid section length	See the distal end rigid section length specification of the optical adapter in use.
Angulation	IV8420U, IV8435U, IV8620U : UP, DOWN, RIGHT and LEFT each 130° * IV8635U : UP, DOWN, RIGHT and LEFT each 120° * *when insertion tube is straight.

Flexible section

Flexibility	IV84 series: Fixed hard tube from the distal end to the main unit. IV86 series: TF tube with flexibility gradually increasing toward the distal end.
Outer diameter	IV84 series: ϕ 4.0 mm IV86 series: ϕ 6.0 mm
Index lines	An orange line is drawn 500 mm from the distal end. White lines are drawn at every 1,000 mm from the distal end. The number of white lines is increased at every 1,000 mm (1 line at 1,000 mm, 2 lines at 2,000 mm).

Total length	IV8420U: 2 m IV8435U: 3.5 m IV8620U: 2 m IV8635U: 3.5 m
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8 Specifications

Main unit

Dimensions	120(W) x 190(H) x 190(D) mm (without insertion tube and cable)	
Weight (including battery)	IV8420U	700 g
	IV8435U	760 g
	IV8620U	800 g
	IV8635U	900 g
LCD panel	3.7-inch VGA	

Input/Output connector

USB connector	Mini-B , USB standard The operating environment is shown below. Windows XP (SP3 or later), Windows Vista, or Windows 7
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Power supply

Battery	Model : IB-1 Nominal voltage: 7.2 V Battery powered operating time: 90 minutes (based on new battery) For details, refer to the instruction manual of your battery.
AC adapter	Model : SA115B-05V Designated AC adapter can be connected to AC adapter connector. Input voltage: 100 V to 240 V AC Frequency: 50/60 Hz Output voltage: 5 V
Battery charger	Model : BCS-1 Input voltage: 100 V to 240 V AC Frequency: 50/60 Hz For details, refer to the instruction manual of battery charger.

Power consumption

	MAX 7 W
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Recording media

	SDHC card (class 6 or later)
Resolution	H640 x V480 (Pixels)
Recording format	Files are stored as compressed JPEG format (Exif 2 compliant).

Still image retrieval

Restrictions	Images recorded on the instrument can be played back.
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Moving image recording

Resolution	H640 x V480 (Pixel)
Recording format	AVI format Xvid MPEG-4 compression Playback on Windows Media Player supported. (Provided that Windows Media Player Ver.11 or later and Xvid video codec are installed.)

Moving image playback

Restrictions	Images recorded on IPLEX UltraLite (this instrument) can be played back.
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Carrying case dimensions and weight

Dimensions	460 (W) x 360 (H) x 165 (D) mm
Weight	Approximately 1.7 kg (IV8420U with all items stowed: 3.5 kg)
Manufacturer	OLYMPUS CORPORATION TOKYO, JAPAN



NOTE

- The images recorded with the instrument can be displayed on a computer, etc., but playback on the instrument of images recorded with an image recording device such as a digital camera or a computer is not supported.
- Windows Media Player is either a registered trademark or trademark of Microsoft Inc. in the U.S. and/or other countries.

External application standard

Low Voltage Directive and EMC Directive 	This product conforms with the following directives. • Directive 2006/95/EC concerning electrical equipment designed for use within certain voltage limits. • Directive 2004/108/EC concerning electromagnetic compatibility when used in combination with devices bearing CE marking either on the products or in its instructions. • This device is designed for use in industrial environments for the EMC performance. Using it in a residential environment may affect other equipment in the environment.
FCC Information	This product conforms to the following. • Part 15 of the FCC Rules • Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. • FCC WARNING Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
WEEE Directive 	The following applies to the mark to the left. In accordance with European Directive 2002/96/EC on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately. Refer to your local Olympus distributor for return and/or collection systems available in your country
RoHS Directive	RoHS compliance model
Chinese RoHS Directive 	This mark indicates the environmental protection use period applicable to electronic information products sold in China in accordance with the "Management Methods for Controlling Pollution by Electronic Information Products" of February 28, 2006 and the "Requirements Concerning Pollution Control Markings for Electronic Information Products." (Caution) During the environmental protection use period harmful substances will not be emitted when used under proper conditions. However, it does not guarantee functional performance of the product during the said period.

8.3 Optical adapter specifications

For 4-mm type insertion tube

When the optical adapter is mounted on the insertion tube.

		AT120D/NF -IV84	AT120D/FF -IV84	AT120S/NF -IV84	AT120S/FF -IV84
Product abbreviation		120DN V84	120DF V84	120SN V84	120SF V84
Character color		Red	Green	Red	Green
Optical system	Field of view	120°	120°	120°	120°
	Direction of view	Forward	Forward	Side	Side
	Depth of field*1	4 to 190 mm	25 to ∞ mm	1 to 20 mm	6 to ∞ mm
Distal end	Outer diameter*2	φ4.0 mm	φ4.0 mm	φ4.0 mm	φ4.0 mm
	Rigid distal end length*3	19.7 mm	19.6 mm	22.2 mm	22.2 mm

- *1 Indicates the range within which the image can be viewed clearly.
- *2 Can be inserted into a φ4.0 mm hole when mounted on the insertion tube.
- *3 Indicates the length of the rigid portion at the insertion tube's distal end when mounted.

For 6-mm type insertion tube

When the optical adapter is mounted on the insertion tube.

		AT40D -IV86	AT80D/NF -IV86	AT80D/FF -IV86	AT120D/NF -IV86
Product abbreviation		40D V86	80DN V86	80DF V86	120DN V86
Character color		Black	Red	Green	Red
Optical system	Field of view	40°	80°	80°	120°
	Direction of view	Forward	Forward	Forward	Forward
	Depth of field*1	200 to ∞ mm	8 to ∞ mm	35 to ∞ mm	4 to 190 mm
Distal end	Outer diameter*2	φ6.0 mm	φ6.0 mm	φ6.0 mm	φ6.0 mm
	Rigid distal end length*3	19.8 mm	19.8 mm	19.8 mm	19.8 mm

		AT120D/FF -IV86	AT80S -IV86	AT120S/NF -IV86	AT120S/FF -IV86
Product abbreviation		120DF V86	80S V86	120SN V86	120SF V86
Character color		Green	Black	Red	Green
Optical system	Field of view	120°	80°	120°	120°
	Direction of view	Forward	Side	Side	Side
	Depth of field*1	25 to ∞ mm	18 to ∞ mm	1 to 25 mm	5 to ∞ mm
Distal end	Outer diameter*2	φ6.0 mm	φ6.0 mm	φ6.0 mm	φ6.0 mm
	Rigid distal end length*3	19.8 mm	25.2 mm	25.2 mm	25.2 mm

- *1 Indicates the range within which the image can be viewed clearly.
- *2 Can be inserted into a φ6.0 mm hole when mounted on the insertion tube.
- *3 Indicates the length of the rigid portion at the insertion tube's distal end when mounted.

Appendix

System chart

