



INSTRUCTIONS

INDUSTRIAL VIDEOSCOPE **IPLEX FX series**

IV8000-2

IV8420

IV8435

IV8620

IV8635

IV8650

IV8675

IV8635X1

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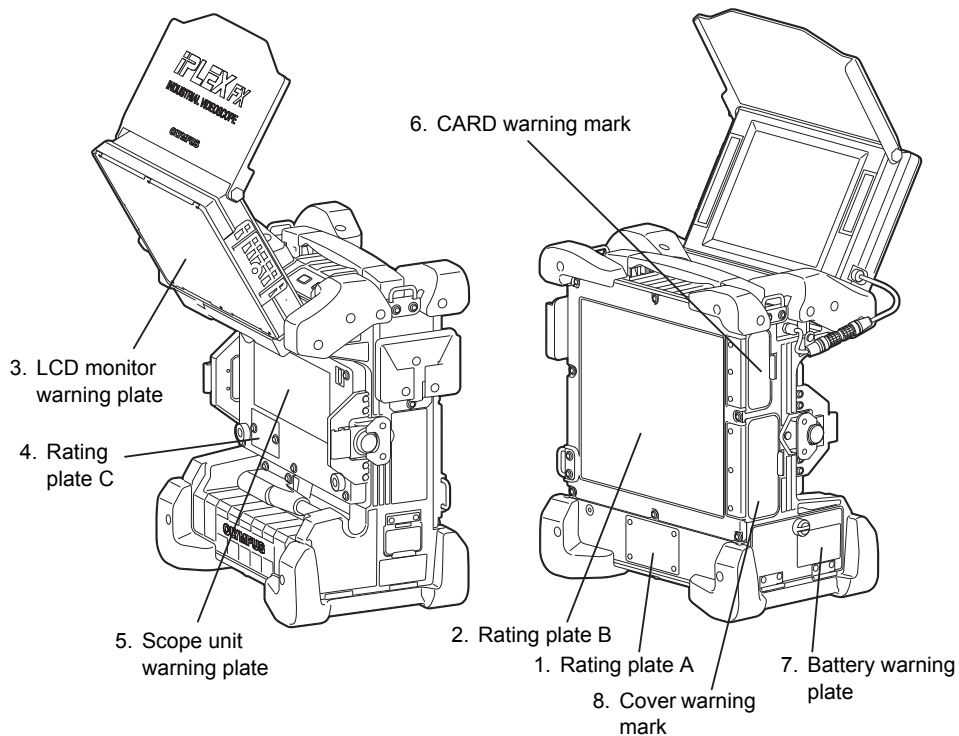
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Warning and Rating Plates

Safety-related labels and symbols are attached to the instrument at the locations shown below.

If labels or symbols are missing or illegible, please contact Olympus.



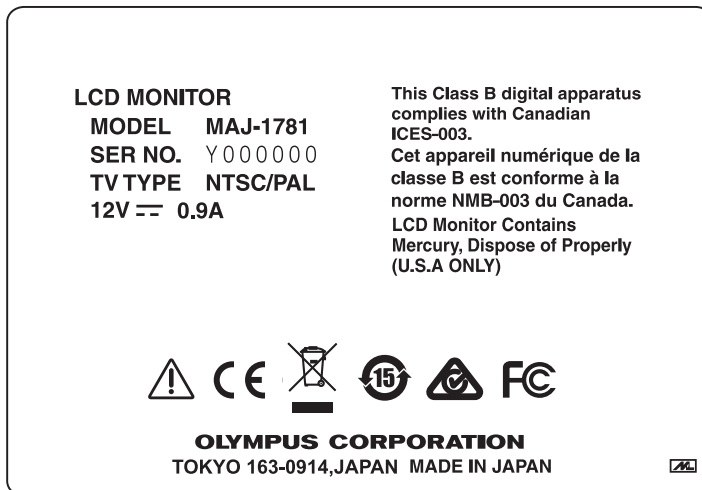
■ 1. Rating plate A



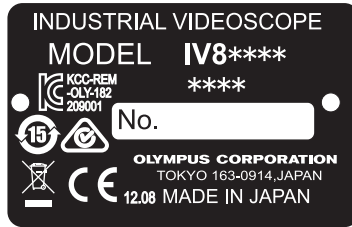
■ 2. Rating plate B



■ 3. LCD monitor warning plate



■ 4. Rating plate C



■ 5. Scope unit warning plate

CAUTION

The distal end of the scope may become hot due to the illumination light or inspection of heated area.
Do not forget to turn off the light source before attaching or detaching the optical adapter.
Touching the distal end immediately turned off light source or inspected heated area may cause burn on your skin.

注意

スコープ先端部は照明光による内部発熱や高温部の検査により熱くなります。光学アダプター着脱時には忘れずに光源をOFFしてください。光源消灯後や高温部の検査後にスコープ先端に触れるとやけどする恐れがあります。



CAUTION

Remove the drop of dirt or water immediately if it attached to the electrodes of the distal end of the scope or the optical adapter.
Using the electrodes while dirt or water is present may cause damage to this equipment.

注意

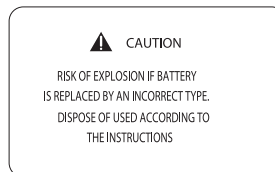
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■ 6. CARD warning mark



■ 7. Battery warning plate



■ 8. Cover warning mark



Important Information – Please Read Before Use

Intended use

This instrument has been designed to be used with IPLEX FX series and ancillary equipment for observation and examination of the insides of a machinery, equipment or building that cannot be observed directly from the outside.

Do not use this instrument for any purpose other than its intended use, particularly for observation or examination of the inside of a human or animal body cavity.

Instruction manual

This instruction manual contains essential information on using this instrument safely and effectively.

Before use, thoroughly review this manual and the manuals of all equipment which will be used during the procedure and use the equipment as instructed.

Keep this and all related instruction manuals in a safe, accessible location.

If you have any questions about any information in this manual, please contact Olympus.

Combined ancillary equipment

Refer to the “System chart” in the Appendix to confirm that this instrument is compatible with the ancillary equipment being used.

Using incompatible equipment can result in malfunction and/or equipment damage.



Repair and modification

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.

Signal words

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 equipment damage.



NOTE

- Indicates additional helpful information.
-

Dangers, warnings and cautions

Follow the dangers, warnings and cautions described below when handling this instrument. The information is to be supplemented by the dangers, warnings and cautions given in each chapter.



DANGER

- Never use this instrument in observation inside the human and animal cavity. The human body or animal may be injured.



WARNING

- Never use this instrument in a flammable atmosphere. Otherwise, an explosion or fire may result.
- Do not use the instrument in an environment filled with fine particles such as metal dust.
- With the exception of the 6 mm and 4 mm-type scope insertion tubes, this instrument and its case are not designed to be waterproof. Except for the scope insertion tube, never use or store the instrument in any location where it might be submerged in water. An electric shock may result.
- Never use this instrument on a piece of electrical equipment being energized. Since the exterior finish of the scope is electroconductive, an electric shock may occur if it is brought in contact with an active part.
- Always turn the [LIGHT] button OFF when discontinuing use of this instrument. Otherwise the light emitted from the scope may heat a nearby object and cause fire ignition.

-
- The distal end of the scope may become hot due to the illumination light or the internal heating caused by electrical parts. Do not forget to turn off the light source before attaching or detaching the optical adapter. Touching the distal end immediately after having turned off light source may cause burn on your skin.
 - Do not allow the light emitted from the scope's distal end enter your eye directly. Otherwise, an eye injury may result.
 - Take special care in handling the hook assembly so as not to damage your eyes with the edge. When the hook assembly is used, make sure to attach the safety cap on the rear edge before manipulating the scope.
 - Should any abnormality be detected during angulation operation, do not continue the angulation operation by force. Otherwise, the scope or examination target may be damaged.
 - Do not subject the LCD surface to impact or strong pressure. Doing so could shatter the LCD screen and cause personal injury.
 - Do not allow a metallic object or a fluid such as water enter the battery compartment, DC IN connector or RECORDING CARD slot. Should any foreign object enter the instrument, remove the battery and the AC adapter from the base unit and immediately contact Olympus.
 - Do not touch the connectors directly by hand. Otherwise, a malfunction or electric shock may result.
 - Do not allow metallic or foreign objects to enter the device through connectors or any other openings. Otherwise, a malfunction or electric shock may result.
 - In case an irregularity such as smoke, abnormal odor or abnormal noise is detected, immediately stop using the equipment even when it looks operable, and do not turn it ON again.
 - On connecting this product, some GFCI safety plug may work its safety circuit up to its threshold. Also, a GFCI safety plug does not prevent from incurring an electrical shock if the exterior of the scope contacts with an active part.



CAUTION

- A message instructing you to clean the electrodes will display when there is an electrode malfunction caused by foreign objects in between the optical adapter and the scope distal end. In this case, immediately stop operation, gently remove the scope and follow the instructions on page 171 under "Error messages".
- The image quality may be deteriorated in high temperature.
- Whenever the red temperature indicator and a temperature warning message appears along with an audible warning alarm, withdraw it from the observation object immediately. Otherwise the insertion tube and optical adapter may be damaged, or any other defects such as malfunction or illumination dim may occur.
- Do not insert the scope in a machine that is running, as this may result in the scope and/or machine damage. Also do not run the machine while the scope is inserted in it.
- The minimum bending radius of the scope's insertion tube is 20 mm for the 4 mm type and 30 mm for the 6 mm type and the 6.2 mm type. Bending at less than the minimum bending radius may result in damage to the scope.
- Do not bring the scope in contact with a liquid other than water, saline, machine oil and light oil. It may damage the instrument.

-
- If the O-ring at the tip of the scope or inside the optical adapter is positioned incorrectly or chaps exist on its surface, water can get into the joint area between the scope and optical adapter which may cause malfunction or damage. In some cases, the illumination dose not light.
 - Do not cover the instrument with a plastic bag or other object during use. If the inside of the instrument cannot be cooled, the instrument damage may result.
 - Do not use this instrument where it is exposed to direct sunlight.
 - The LCD monitor may not display data normally when the instrument is used in an environment where temperatures are below 0 °C. Use the instrument after using a heater to bring the area to room temperature.
 - Bringing the instrument indoor from cold atmosphere subjecting it to sudden temperature change can cause condensation to form inside the instrument. Using the instrument while condensation is formed creates the risk of malfunction. Wait until the instrument reaches the same temperature as the room before using it.
 - Never use the instrument in areas where strong radiation is present.
 - Do not remove the recording card from the RECORDING CARD slot while playing back or recording still images, audio and movies. Otherwise, the data recorded in the recording card may be destroyed.
 - The CF card is a static sensitive device and static electricity may cause it to malfunction. Discharge static electric charges before using a CF card.
 - Take care not to have your feet caught by a cord including the power cord or scope insertion tube.
 - Do not pull the cable of the scope, control unit or other equipment with a strong force. Otherwise, the scope or cable may be damaged or the instrument may topple down or drop. Also, if the operator is using the shoulder strap, it may cause them to fall over.
 - Do not pull base unit while holding the scope, control unit or other cables.
 - When opening or closing the LCD monitor, take care that you do not pinch your fingers between the LCD monitor and the base unit.
 - Do not operate the [ANGLE] joystick of the control unit with intensity while the [ANGLE LOCK] lever is pulled, otherwise it may cause malfunction.
 - If the USB connector or other connectors become wet, wipe them dry. Also, if any foreign matter gets into a connector, remove it.
 - Accidentally dropping the base unit while cables, a USB memory device, or other device is attached to a connector can damage the connector or the item that is attached to it.
 - Use USB connectors only to connect via a USB cable to a computer, a USB memory, or a USB keyboard recommended by Olympus. Never connect any other type of USB device.
 - Make sure that battery cover, I/F connector cover, slot cover, AC adapter cover are firmly closed.
 - Do not open the battery cover, I/F connector cover, slot cover, AC adapter cover with wet hands, or under damp or dusty environment.
 - Do not expose optical lens to the sun or a laser beam during use or at the time of storage.
-

**NOTE**

- The images recorded with instrument can be displayed on a computer, etc., but it is not possible to play back images recorded with an image recording device such as a digital camera or a computer on the IPLEX FX series instrument. Also note that the images recorded with an IPLEX FX series instrument cannot be played back if the images are recorded in a different TV format (NTSC/PAL).
 - When using a stereo optical adapter and TIFF is selected from the menu, a TIFF-YC format uncompressed TIFF image (image with file extension TIF) is generated when images are recorded. When images recorded with the IPLEX FX series are reproduced on a computer, certain software may be unable to reproduce images in the TIFF-YC format. Use bundled IPLEX VIEWER PLUS to play back TIFF images from the IPLEX FX series on your computer.
 - Windows Media Player is either registered trademarks or trademarks of Microsoft Inc. in the U.S. and/or other countries.
 - This product uses multilingual Advanced Wnn from Omron Software Co., Ltd., for character conversion.
Multilingual Advanced Wnn© OMRON SOFTWARE Co., Ltd. 2005-2008 All Rights Reserved.
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Operating environment features

The operating environment performance is confirmed by the following tests (United States Defense Standard) under battery operation.

Note, however, that meeting operating environment specifications does not constitute any guarantee against damage to or malfunction of this equipment. Also, subjecting this equipment to strong shock or impact may cause the equipment to no longer meet operating environment specifications.

Be sure that you fully understand the contents of “Dangers, warnings and cautions” (page 5) and all the precautions in each section of this manual before using this equipment.

Vibration	MIL-STD-810F, Method 514.5, Procedure I (General vibration Test)
Shock (*1)	MIL-STD-810F, Method 516.5, Procedure IV (Transit drop Test)
Water Resistance (*2)	MIL-STD-810F, Method 506.4, Procedure I (Rain and blowing rain Test)
Humidity	MIL-STD-810F, Method 507.4,
Salt Fog	MIL-STD-810F, Method 509.4,
Sand and Dust (*2)	MIL-STD-810F, Method 510.4, Procedure I (Blowing dust Test)
Explosive Atmosphere	MIL-STD-810F, Method 511.4, Procedure I, (Operation in an explosive atmosphere Test)
Icing / Freezing Rain	MIL-STD-810F, Method 521.2
Electromagnetic Interference (EMI)	MIL-STD-461E, RS-103, (Radiated susceptibility Test for Non-Metallic below deck shipboard conditions)

*1 In case that the LCD monitor is folded down into the main body in the carrying and transport position. In such a case, the LCD monitor is susceptible to be damaged.

*2 This equipment meets IP55 specifications for dust and water resistance.



CAUTION

- The included accessories (e.g. charger) do not offer these features.



NOTE

- The United States Defense Standard, often called a military standard, or “MIL-STD”, is used to help achieve standardization objectives by the U.S. Department of Defense.
-

Handling of the battery

Follow the dangers, warnings and cautions described below when handling the battery. Otherwise, battery fluid leak, excessive heat generation, smoke, battery burst, electric shock and/or burns may result.



DANGER

- In case of Li-ion operation, be sure to use the battery and battery charger designated for IPLEX FX series.
- 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.
- Do not install and use the battery by reversing the polarity. If the battery cannot be installed properly in the instrument, do not attempt to insert it by force.
- Do not attempt to apply solder directly on a terminal. Otherwise, a hazardous situation such as destruction of the terminal safety valve or scattering of battery fluid may result.
- Do not interconnect the electrodes of the battery through a metallic object or carry nor store the battery together with a metallic necklace or hairpin.
- Do not connect the battery directly to a power outlet or the cigar lighter of an automobile.
- Do not throw the battery in fire or heat the battery.
- Penetration of battery fluid in an eye may result in loss of eyesight. Should this occur, rinse eyes thoroughly with clean water and immediately have a physician's treatment.
- Do not attempt to open or modify the battery.
- Do not immerse the battery in fresh or sea water, nor moisten the battery.
- Do not recharge the battery near a fire or under direct sunlight.
- Do not pierce the battery with a needle, hit the battery with a hammer or step on the battery.
- Never drop or throw the battery, or subject it to strong impact.



WARNING

- Do not use a battery that is not recommended for IPLEX FX series.
- Do not attempt to recharge a battery that is not designated for IPLEX FX series.
- 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 presents an irregularity such as fluid leak, discoloration, deformation or abnormal condition.
- If the battery fluid attaches to your skin or clothes, immediately rinse with clean water such as tap water. Otherwise, a skin injury may result.
- Do not deform the battery compartment or put a foreign object in it.
- Do not cover the battery charger and battery with clothes or cushion during recharging. Also avoid any situation in which the covering of the battery charger and battery by such objects is expectable.

**CAUTION**

- Do not soak the battery in or moisten it with water including rainwater and seawater.
- Do not leave the battery in a place subject to moisture, water leak or extremely high or low temperatures.
- Do not touch the battery terminals with a wet hand.
- Be sure to recharge the battery before using them for the first time after purchase or after they have not been used for a long period.
- When the battery is not to be used for a long period, be sure to remove them from the base unit. Otherwise, battery fluid leak and heat build-up may result in a fire or injury.
- Do not use or leave the battery in a place with high temperature, for example under direct sunlight, in a closed automobile under the sun or in front of heating equipment.
- The battery is hot after long hours of operation of IPLEX FX series. Do not take out the battery immediately after use, as this may result in burning your hand.
- Do not leave the battery in the reach of children.
- When replacing the battery, to not repeatedly remove and load the battery rapidly. Doing so may make it impossible to turn on power.

**NOTE**

- Use the battery correctly, as incorrect use may result in fluid leak, excessive heat generation and/or damage. When replacing the battery, install them correctly by observing the insertion direction.
 - 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.
 - The continuous operating time of the IPLEX FX series time with a fully charged battery condition is approx. 150 min. (fully-charged new battery). When long hours of battery-powered operation are expected, it is recommended to prepare charged batteries as spares.
 - The E/F slide switch on the side of the battery is a manual switch used to assist you checking if the battery is empty or fully charged. Set the switch to "F" after fully charging the battery and to "E" after it has been discharged. (This switch is connected electrically to nothing. It is exclusively used as a reminder that you have recharged or emptied the battery.)
 - The battery is designated as a recyclable product. When discontinuing the use of the battery, be sure to have it recycled in compliance with your local regulations.
 - Recommended temperature range for Li-ion battery operation.
Discharge (when using the instrument): 0°C to 50°C
Recharging : 0°C to 40°C
Storage : -20°C to +50°C
Using the battery under a temperature outside the above temperature range will result in degradation of the performance and service life. When storing the battery, be sure to remove it from the base unit.
 - The battery is a consumable item.
-

Product configurations of the IPLEX FX series

The IPLEX FX series includes base unit IV8000-2 with a scope unit selected from the following available model.

The simplified specifications of the scope units are shown below.

For detailed specifications of the individual models, see “Chapter 10 Specifications” (page 180).

IPLEX FX series model names		Max. insertion tube outer diameter	Insertion tube length	Channel
IV8000-2	IV8420	φ 4.0 mm	2 m	Not available
	IV8435		3.5 m	
	IV8620	φ 6.0 mm	2 m	
	IV8635		3.5 m	
	IV8650		5 m	
	IV8675		7.5 m	
	IV8635X1	φ 6.2 mm	3.5 m	Available channel diameter φ 1.6 mm

Refer to the “System chart” in the Appendix for the IPLEX FX and optional equipment configurations.

Chapter 1 Checking the package contents

1.1 Checking the package contents

Match all items in the package with the components shown on “IPLEX FX series package contents” below. If any item is damaged, a component is missing or you have any questions, do not use the instrument, but immediately contact Olympus.

■ IPLEX FX series package contents

Name	Count
Base unit (IV8000-2)	1
Scope unit (4-mm type, 6-mm type or 6.2-mm type)*1	1
Recording card (CF card)	1
AC adapter	1
AC power cord	1 *5
Optical adapter case	1
USB/card reader/writer *2	1
IPLEX FX Utility Disc (IPLEX VIEWER PLUS)	1
Shoulder strap	1
Optical adapter case holder	1
Lens cleaning kit (cleaning fluid, cotton swab, brush)	1
Tip cap (4-mm type, 6-mm type or 6.2-mm type) *1	1
Stopper	1
Hook assembly *6	2
Hook (spare) *6	6
Safety cap *6	2
Port cap *6	1
Handle holder *6	1

Name		Count
Instruction Manual	IPLEX FX series (This booklet)	1
	IPLEX FX Quick guide	1
	AC adapter	1
	USB/card reader/writer	1
	IPLEX FX utility disc	1
	Software license agreement	1
	Spare tag for CF card	1
Scope unit name sticker *3		1
Spare tag for CF card *4		3
Carrying case		1

*1 Included when purchased as a set.

*2 Use while connected to a computer. By doing so, images recorded on a recording card (CF Card) can be easily downloaded to a computer.

*3 Affix at an easy-to-see location on the carrying case.

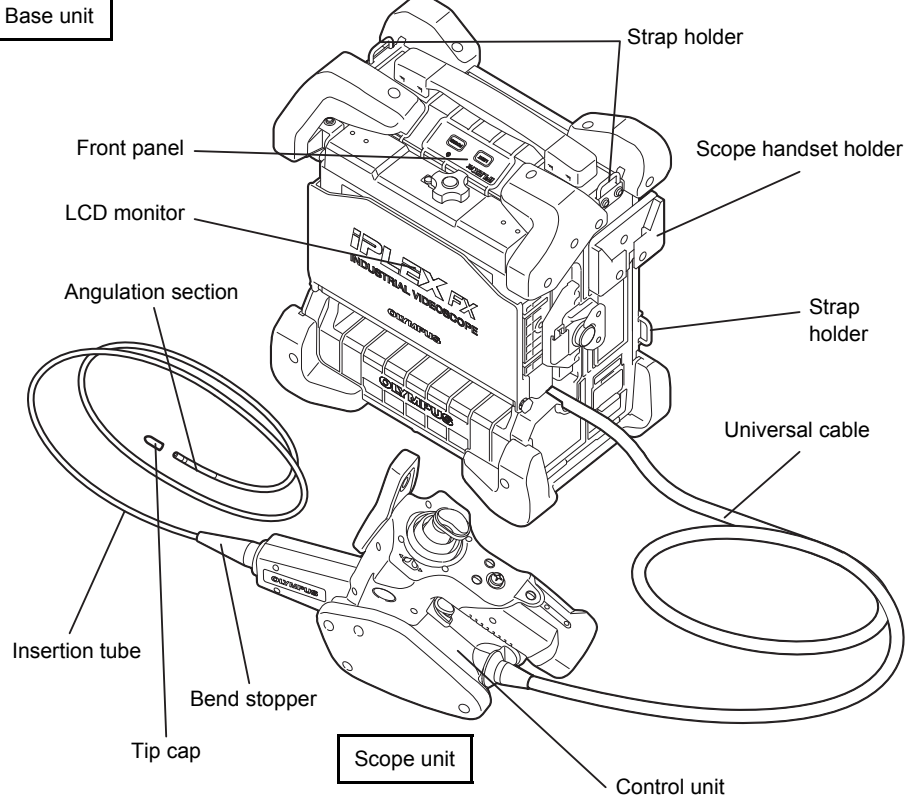
*4 Please refer to the instruction manual of the spare tag for CF card.

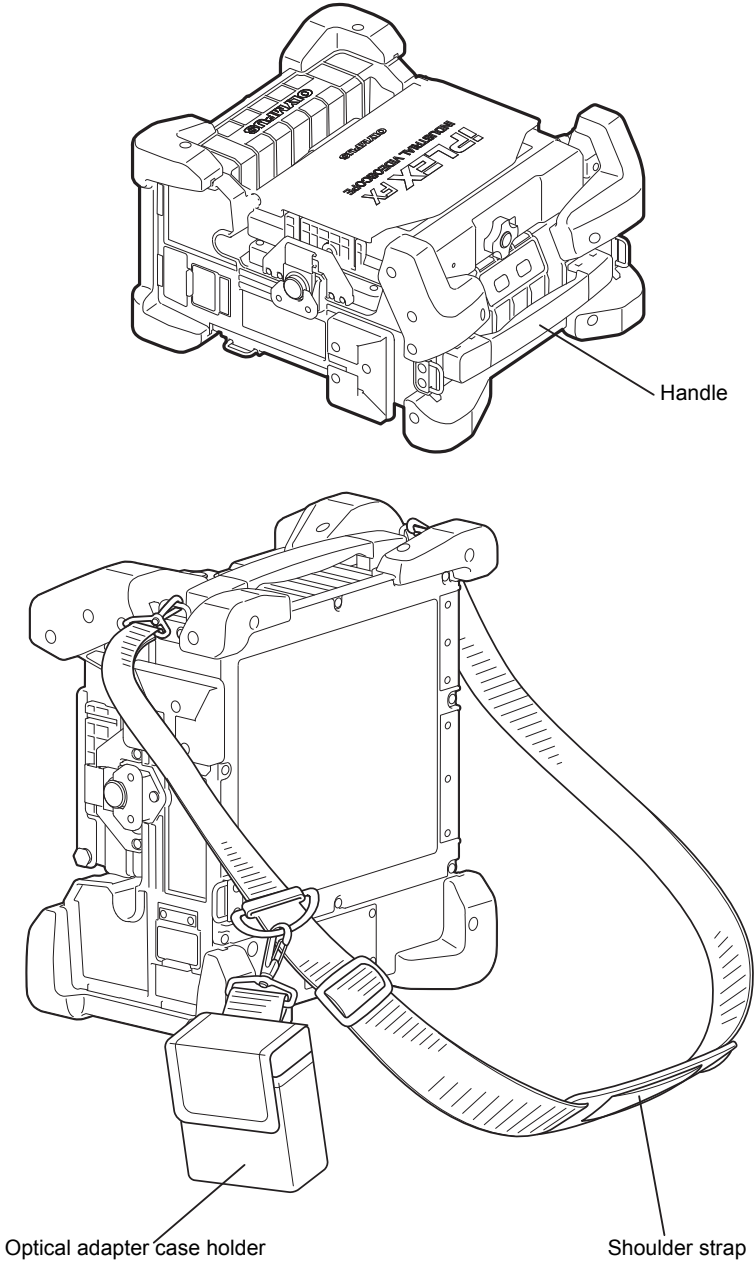
*5 For a PAL configuration set, 2 power cables, each with a different plug type, are provided.

*6 For IV8635X1 only.

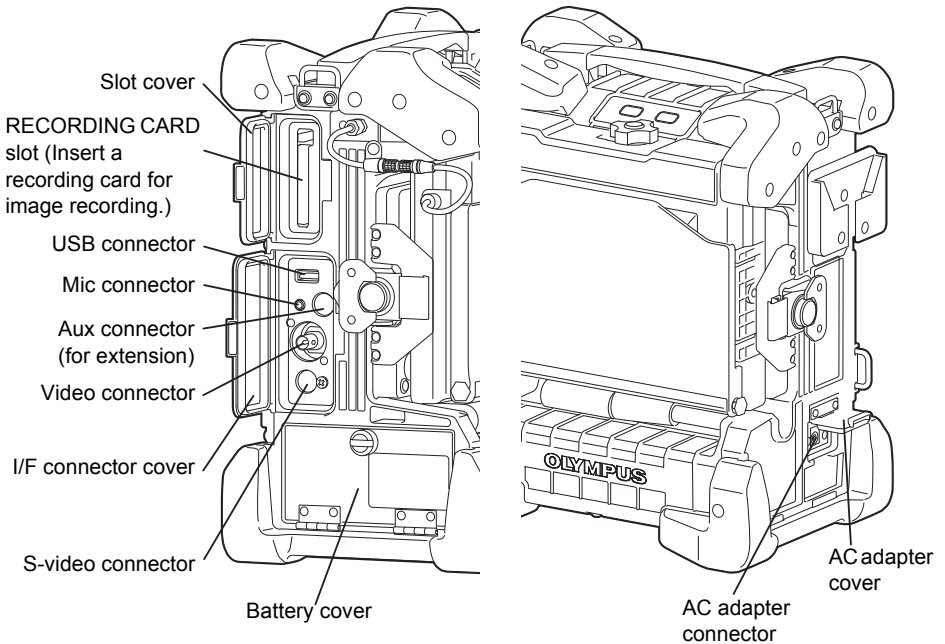
Chapter 2 Instrument nomenclature and functions

2.1 System nomenclature



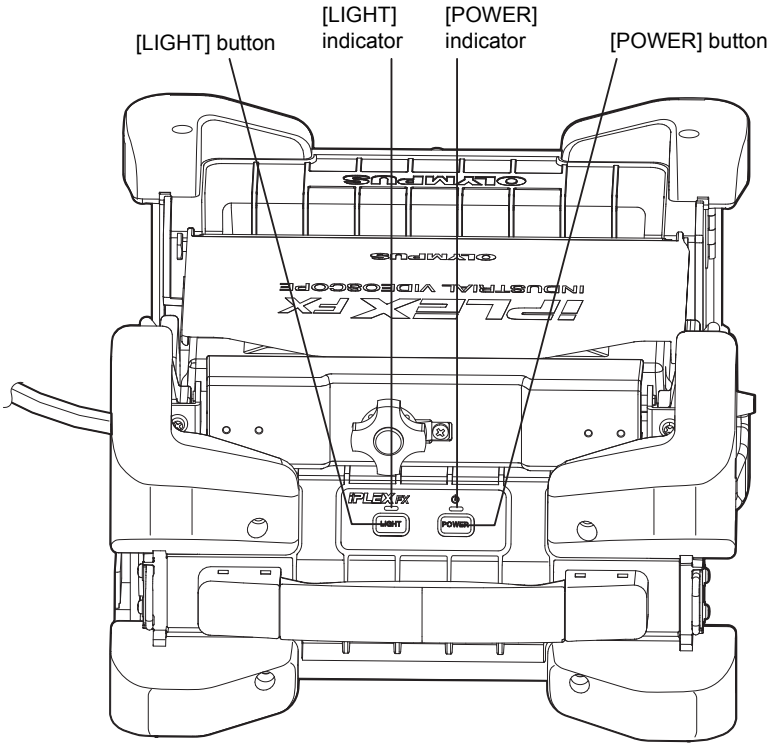


2.2 Base unit nomenclature and functions

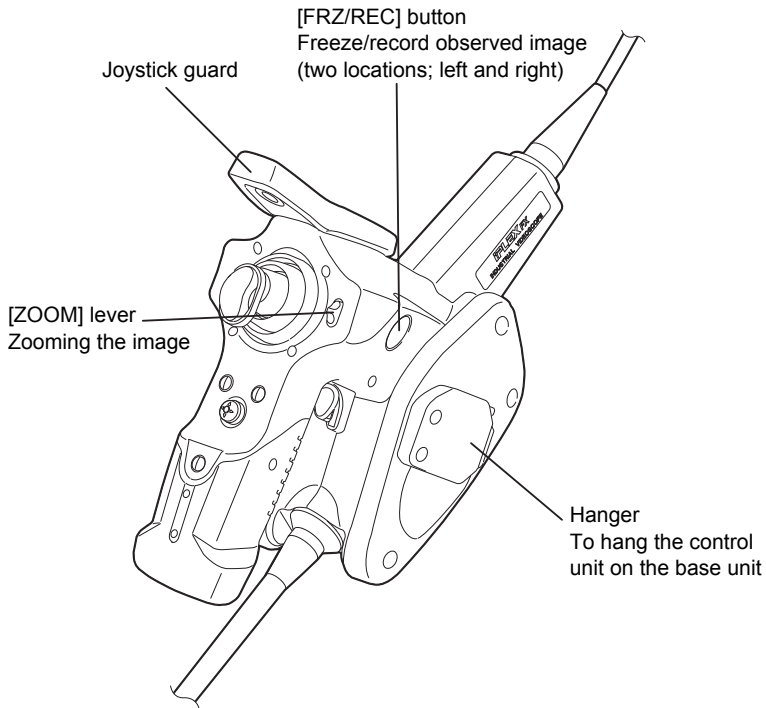
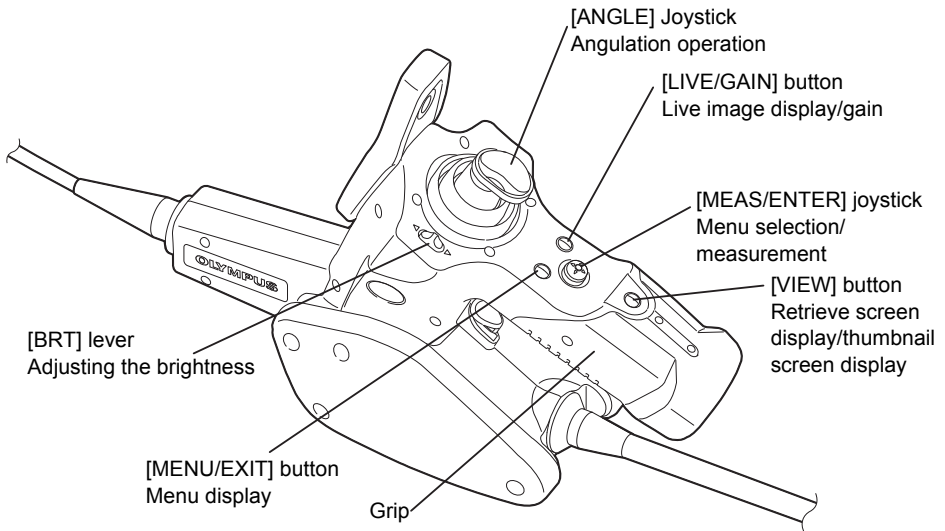


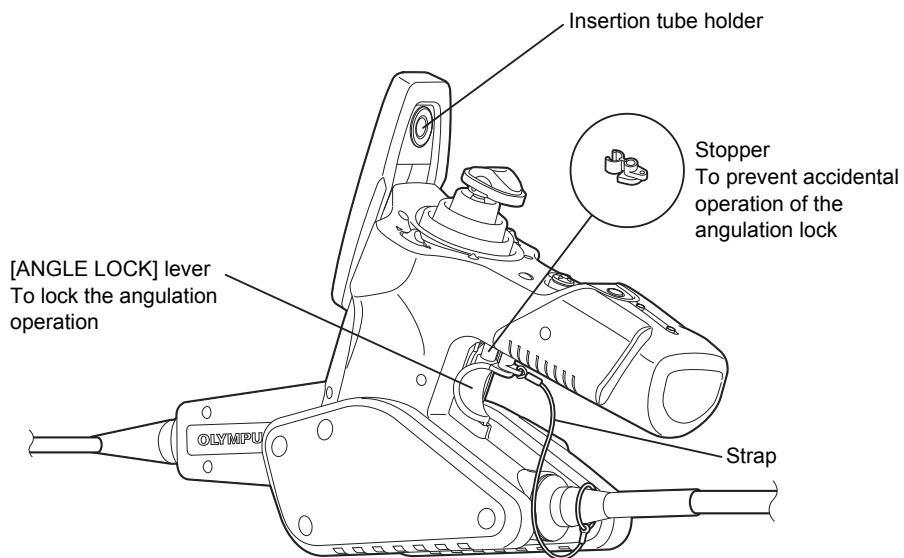
CAUTION

- Be sure to connect the optional MH-888 S-video cable (option) with core to the S-video connector.
Connect the plug with core of the S-video cable to the S-video connector of the base unit.



2.3 Control unit nomenclature and functions

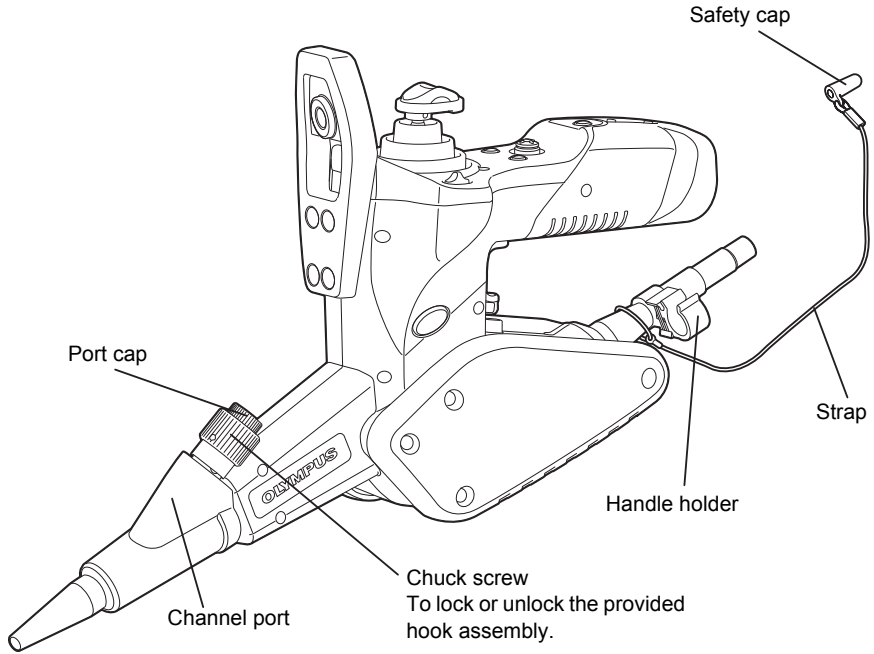




NOTE

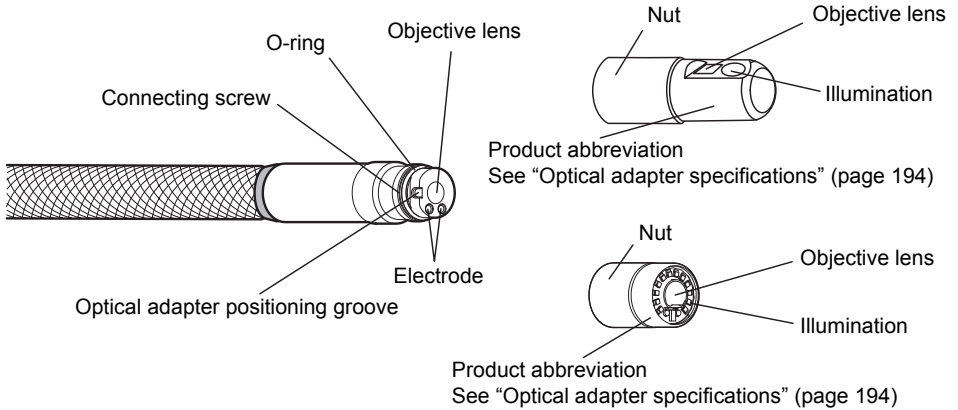
- The insertion tube can temporarily be fixed on the control unit by inserting it into the insertion tube holder hole.
-

■ Channel port nomenclature and functions (IV8635X1 only)

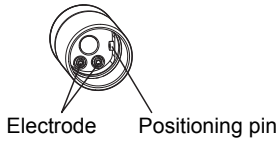


2.4 Optical adapter nomenclature and functions

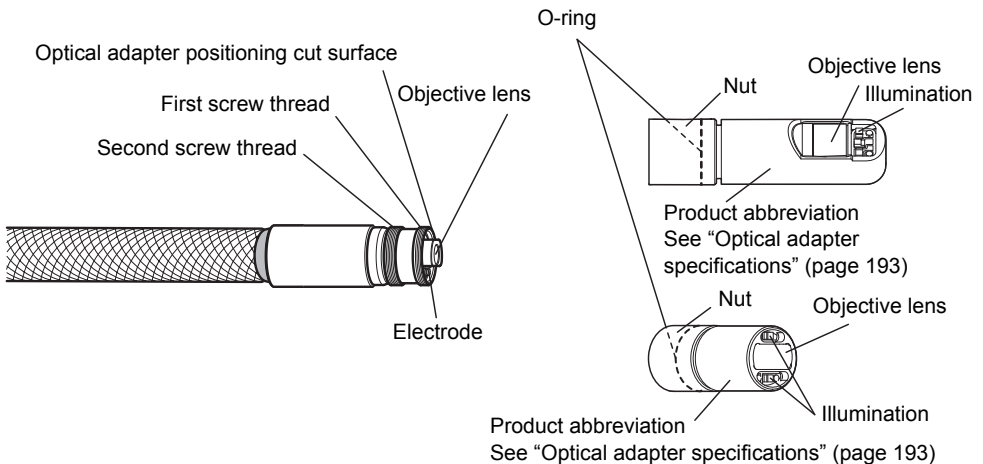
■ For 6-mm type



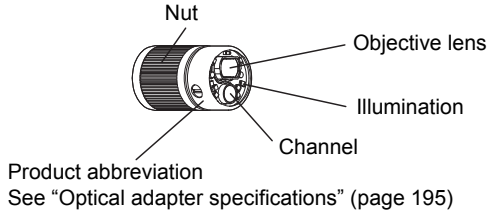
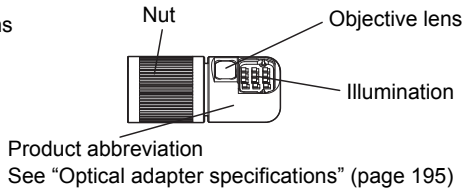
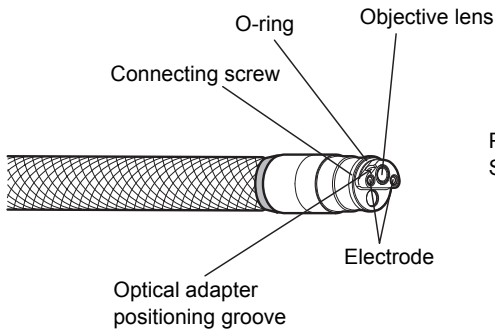
(Optical adapter internal view)



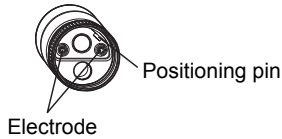
■ For 4-mm type



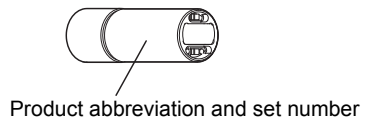
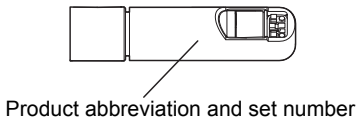
■ For 6.2-mm type (IV8635X1)



(Optical adapter internal view)

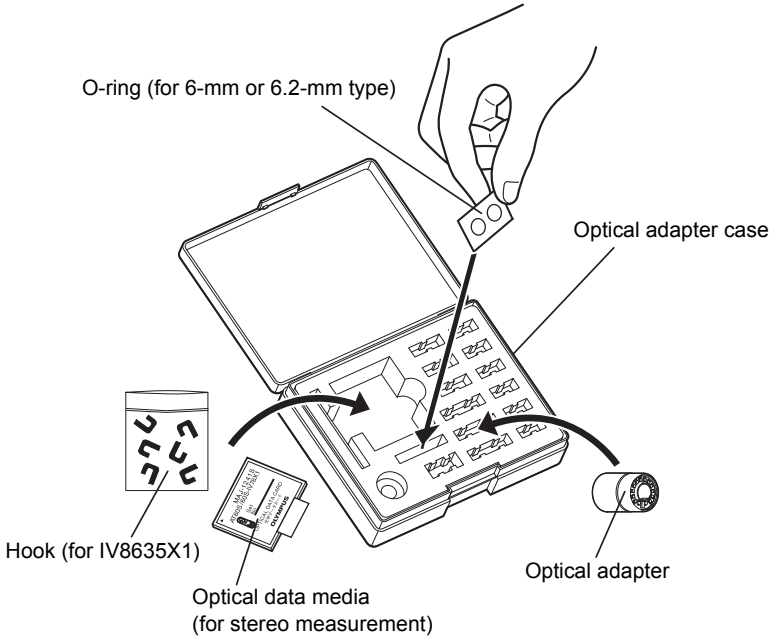


Stereo optical adapter

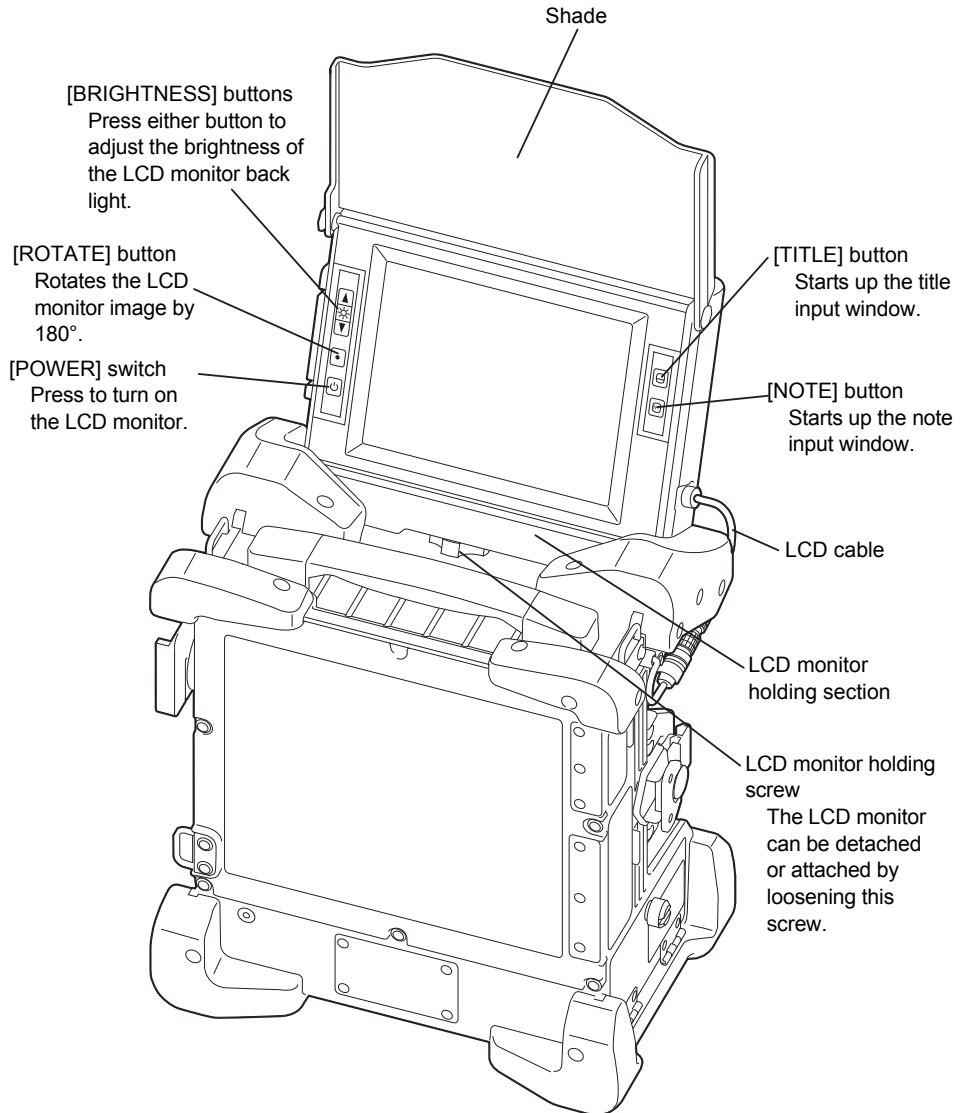


Storage in the optical adapter case

The optical adapter, the O-ring (for 6-mm or 6.2 mm type) and optical data media (CF card or USB memory) need to be stored in the optical adapter case provided with the scope unit.



2.5 LCD monitor nomenclature and functions



Chapter 3 Preparation and inspection before observation



CAUTION

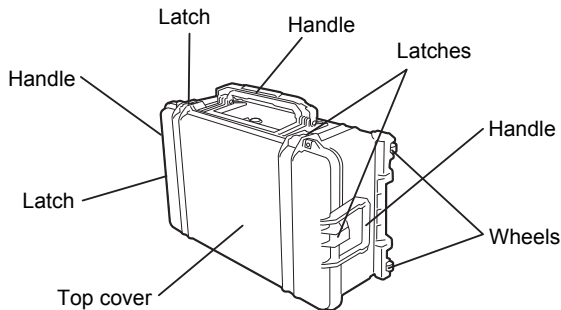
- Be sure to finish the preparation and inspection work described below before use. If any irregularity is suspected, do not use the instrument but see “Chapter 9 Troubleshooting” (page 170) to solve the problem. If irregularity is still suspected, contact Olympus. Damage or irregularity may compromise the correct functioning of the instrument and may result in more severe damage to the examined subject.
 - Inspections are not only required before use, but should be conducted periodically.
-

3.1 Transportation of the case



CAUTION

- Before transporting the case, inspect the exterior parts, handles, wheels and latch of the case for irregularities such as damage and loosening.
-



■ When using the handle

1

Ensure that the latch is closed firmly before lifting the case.



CAUTION

- Never move the equipment around by the scope or cables.
 - If the latch is not completely closed, the top cover may open accidentally when the case is lifted.
 - Do not kick the case or move it with your feet.
-

■ Towing using the extendable handle

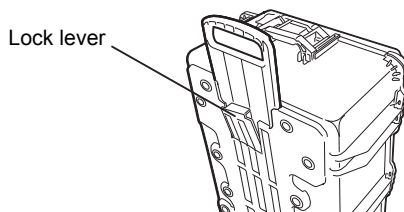
1 Make sure that the latch is completely closed.



CAUTION

- If the latch is not completely closed, the top cover may open accidentally when the case is lifted.

2 Pull the lock lever towards you to unlock and extend the handle. Pull the handle out until you hear it click. To stow the handle, pull the lock lever towards you to unlock the handle, and then push the handle in until you hear a click.



CAUTION

- Be sure to pull out the extendable handle as far as it will go. The handle is not locked if pulled out only part way, which creates the risk of it suddenly extending or contracting.
- Be careful you do not catch your hand when storing the handle inside the case.
- The extendable handle is used to roll the case on the wheels on its lower side. Do not attempt to lift the case by holding the extendable handle.

3 Hold the handle to lift one side of the case and move it by rolling the wheels on the bottom of the case along the ground.



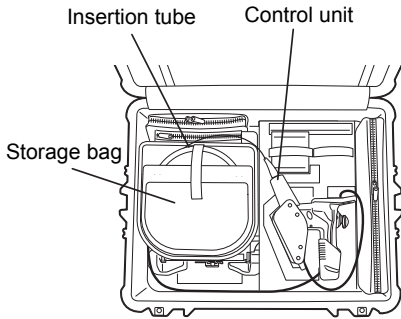


CAUTION

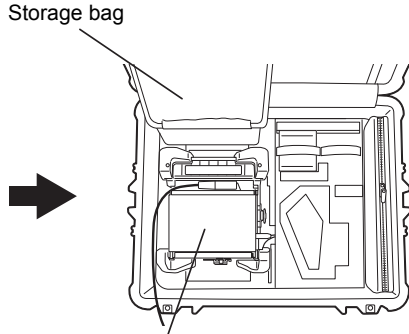
- Always bring the wheels in contact with the ground before rolling the case. Otherwise, the case may be damaged or fall over.
 - Move the case carefully when going over a step. Be careful that the case does not fall over.
 - When transporting the case, be careful not to hit your feet with a corner or other part of the case.
-

■ Taking the instrument out of the case

Remove the equipment in the order of: Insertion tube → Control unit → Base unit.

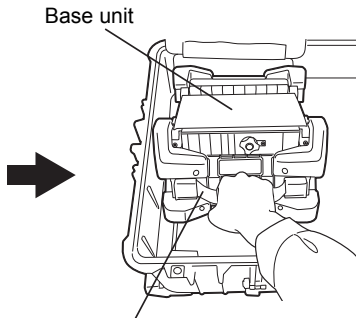


Take the insertion tube, which is on the drum, out of its storage bag.



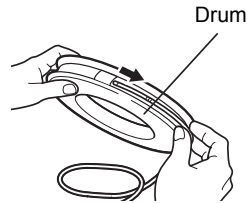
Base unit

Remove the control unit.



Handle

Attach the soft handle and lift the base unit to remove it.



Remove the Insertion tube from the drum.

WARNING

- Never use the base unit while it is accommodated inside the case. If the top cover of the case is left open, it may close unexpectedly and pinch your hand or a cable.

CAUTION

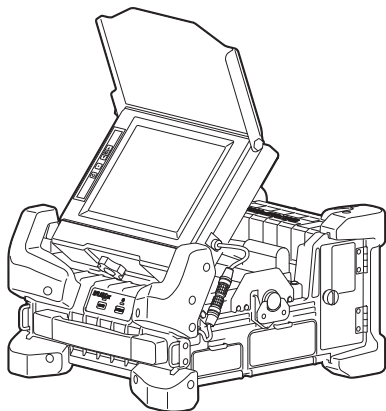
- Place the case on a level surface so it is stable.
- When opening or closing the top cover of the case, always make sure that the extendable handle is in the stored (non-extended) position.
- To open the top cover of the case, release the latch on the front of the case.
- Do not pull the insertion tube with excessive force when taking it out of the storage bag.
- Hold the drum while pulling the insertion tube out.

Chapter 3 Preparation and inspection before observation

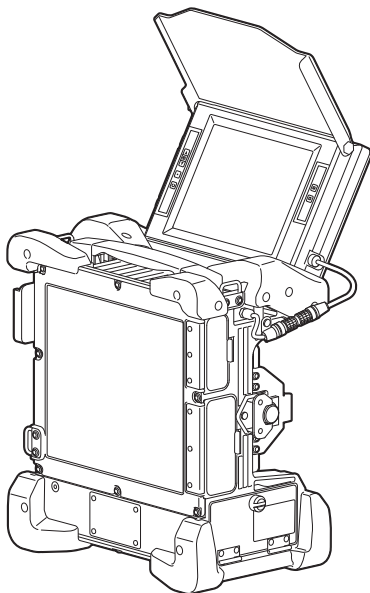
- When removing the insertion tube from the drum, do not apply excessive force. Otherwise, the insertion tube may be damaged.
 - When taking the control unit or base unit out of the case, never hold them by the scope (including the bend stopper), universal cable, LCD cable or LCD monitor. It may damage the instrument.
 - Check if the gaskets of scope unit, battery cover, I/F connector cover, slot cover, AC adapter cover, and base unit are kept clean. Wipe off with a clean, soft cloth if dirt or a foreign substance is attached.
 - Check the gaskets of scope unit, battery cover, I/F connector cover, slot cover, AC adapter cover, and base unit if cuts or gaps are not available.
 - Make sure that the scope unit is attached to the base unit firmly.
-

3.2 Laying down the base unit

- 1 The base unit can be operated either on its side or on its base as illustrated below.



Operated on its base



Operated on its side



CAUTION

- Place the base unit on a level surface so it is stable. The base unit can tip over if it is not stable.
- Do not place the base unit in a high place. Doing so may result in the base unit falling and being damaged.

3.3 Replacing the scope unit

The scope unit must be changed to switch the scope's insertion unit from the 4-mm type to the 6-mm type.



WARNING

- When replacing the scope unit, choose a location where foreign matter, dust, rain will not get on it. Never replace the scope unit while your hands are wet. Doing so may cause an electric shock.
- Take care so metal objects, dirt, or other foreign matter, or water or other liquid do not get into the CCU connectors or slits of the base unit or scope unit. Any of these can damage the instrument.



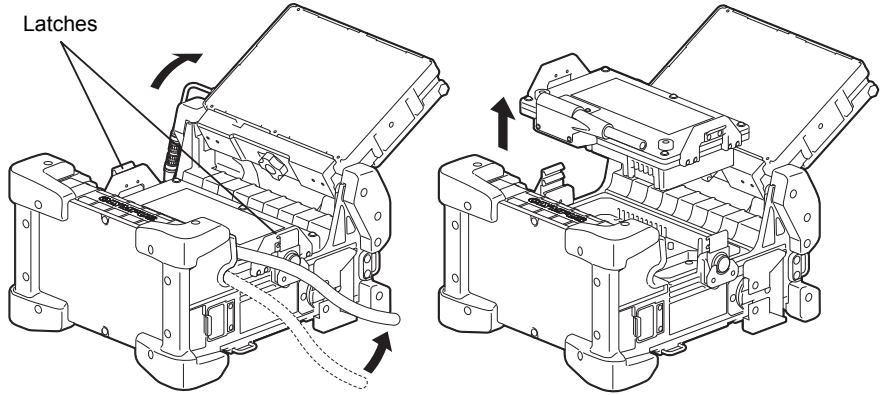
CAUTION

- Make sure that the power is turned off before replacing the scope unit.
 - Do not subject the CCU connector to strong impact. Doing so may damage the CCU connector.
 - Do not touch the electrical contacts of the CCU connector with your hands. Doing so may cause the instrument to be damaged by static electricity.
 - The replacement of the scope unit should always be performed on a flat surface.
 - When replacing the scope unit, do not hold it by the bend stopper or scope body.
 - Make sure that the tip cap is affixed to the scope tip before replacing the scope unit. Shock or impact to the tip while the tip cap is not affixed creates the risk of tip damage.
-

■ Removing the scope unit

- 1** Raise the LCD monitor.
- 2** The universal cable can be separated from the notch.
- 3** Rotate the latches (two positions) on the scope unit counterclockwise to unlock them.

4 Remove the scope unit.



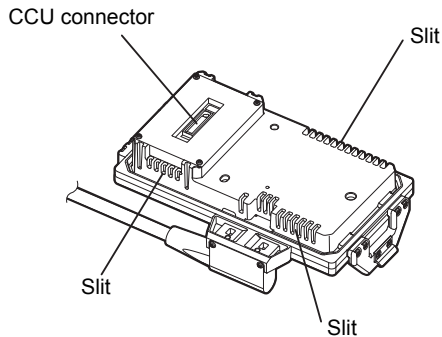
■ Attaching the scope unit




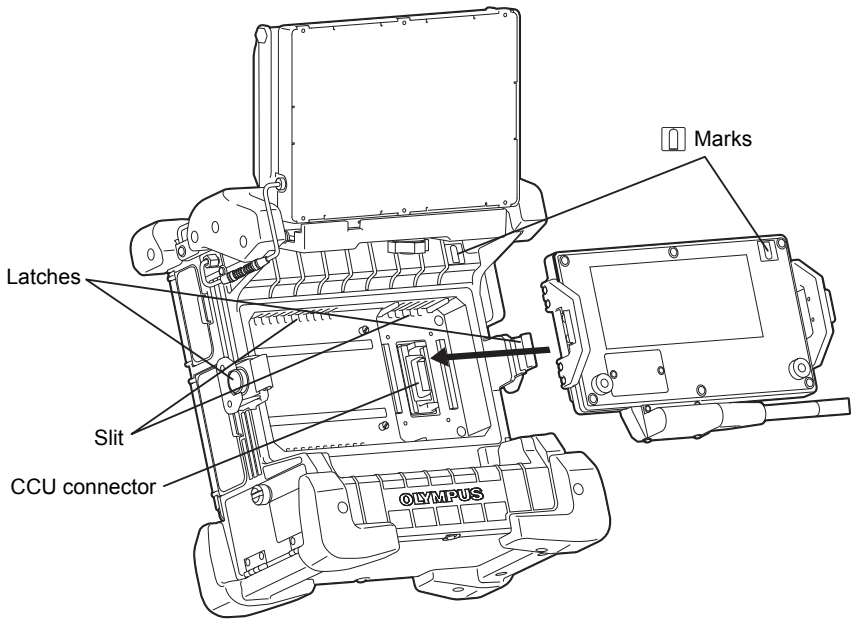
CAUTION

- Always attach the scope unit on a flat surface.
- Take care that static electricity does not short between the base unit's CCU connector and the scope unit.

1 Make sure that the CCU connector end is clean. If it is dirty, wipe it clean using a cotton swab from the lens cleaning kit.



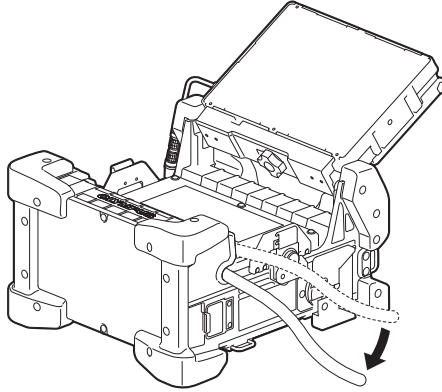
- 2** Line up the marks  on the scope unit and the base unit while positioning the scope unit on the base unit and then rotate the latches (two positions) clockwise to lock them.



CAUTION

- Be sure to insert the scope unit gently. Be careful that the CCU connector is not damaged.
 - Firmly lock the two latches. Failure to lock the latches creates the risk of dropping of the scope unit, failure to turn on due to improper electrical contact, and the inability of the scope to meet environmental specifications regarding rain-proof, etc.
-

3 The universal cable can be inserted into the notch.



3.4 Preparing the power supply



WARNING

- Do not bend, pull, twist, crush or apply excessive force to the power cord of the AC adapter. Otherwise, a break in the power cord wires may cause a fire or electric shock.
- Ensure that the power cord is normal before connecting it. Using a power cord with irregularities may result in an electric shock.
- Be careful not to injure yourself when replacing the battery.

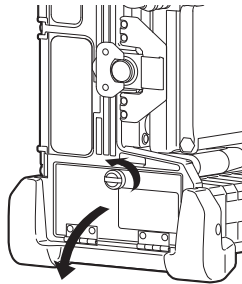


CAUTION

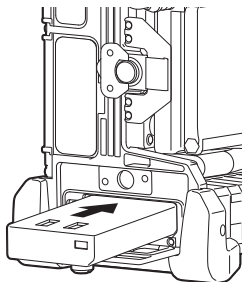
- Be careful not to accidentally drop the battery during replacement.
 - Before using the battery, read the dangers, warnings and cautions in “Handling of the battery” under “Important Information – Please Read Before Use” on (page 10).
 - The battery indicator flashes when a battery is continuously used under low-voltage conditions. Eventually the power will turn off if a low battery continues to be used.
-

■ Supplying power from the battery

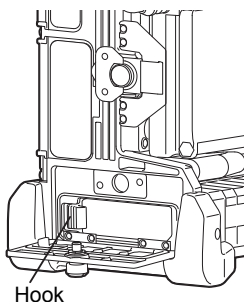
- 1** Make sure that the [POWER] button of base unit is off (POWER indicator is out).
- 2** Turn the battery cover screws counterclockwise to open the battery cover.



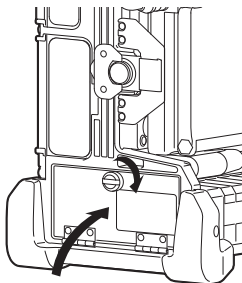
- 3** Align a fully charged battery with the notch in the opening and insert the battery.



- 4** Insert the battery until you hear a click and make sure that the hooks on the mouth of the case are engaged.



- 5** Close the battery cover and turn the battery cover screws clockwise.



■ Supplying power from the AC adapter

- 1** Connect the AC adapter to the AC adapter connector on the base unit.
- 2** Ensure that the AC power cord is connected securely to the AC inlet of the AC power adapter.
- 3** Plug the AC power cord securely into a power outlet.



WARNING

- Inspect the power cord before use and check for any signs of damage. Using a power cord with irregularities may result in an electric shock.
- NTSC: AC power cord is only used for 100 - 120 V AC, 50/60 Hz. If the instrument is operated with AC power cord into inappropriate AC power inlet, fire or electric shock may result.
PAL: AC power cord is only used for 220 - 240 V AC, 50/60 Hz. If the instrument is operated with AC power cord into inappropriate AC power inlet, fire or electric shock may result.
- Never use an AC adapter other than the designated AC adapter. Otherwise, malfunction of the instrument or unexpected damage may result.
- The AC adapter is not water resistant. Never use it in the rain or in any location where it can become wet. Water creates the risk of electric shock.



NOTE

- For information about how to connect the AC adapter, see the AC adapter's instruction manual.
-

3.5 Inspecting the scope



CAUTION

- Be sure to hold the scope by a position on the rear of the angulation section. Otherwise, the angulation section may be damaged.

■ Inspecting the external appearance of the scope

- 1** Check visually that the external finish of the complete length of the scope and universal cable are free of irregularities such as deformation.
- 2** Check that the external covering material of the scope, other than the angulation section, is not loose.



CAUTION

- If the scope is deformed, you may not be able to withdraw it from the observation object.
- If the external material of the insertion tube is cut, take care against injury during inspection.

■ Inspecting the scope distal end



WARNING

- The distal end of the scope may become hot due to the illumination light or the internal heating caused by electrical parts. Do not forget to turn off the light source before attaching or detaching the optical adapter. Touching the distal end immediately after having turned off light source may cause burn on your skin.

- 1** Make sure that power is turned off.
- 2** Remove the tip cap from the scope distal end. For 6 mm type and 6.2 mm type scopes, make sure that the O-ring on the scope distal end did not detach after removing the tip cap (see “Inspecting the O-ring” (page 40)).

- 3** Check that there is no dirt or water on the objective lens and the electrodes of the scope distal end. If dust or water is present, wipe them clean with a soft piece of gauze, a cotton swab, or a sweep them off with a brush, grasping at hard part of distal end. The best results may be obtained using the lens cleaning fluid provided in the lens cleaning kit.



CAUTION

- Using the objective lens or the electrodes of the scope distal end while dirt or water is present may cause damage to the optical adapter or the scope distal end.
-

- 4** Use the brush provided in the cleaning kit to wipe off any dirt found in the positioning groove, the positioning cut surface or screws on the scope's distal end. Note that insufficient cleaning can result in a loss of waterproofing between the optical adapter and the scope's distal end.

- 5** Check that the distal end of the scope is not deformed, loose or unusual wear on the connecting screw.



CAUTION

- Never use the distal end of the scope if any part is loose. Otherwise, the loose part may fall into the inspection object.
 - The angulation section is composed of precision parts. Do not pull the distal end of the scope, do not grasp/bend with a strong force. Otherwise, the parts in the angulation section may be damaged.
-

■ Inspecting the O-ring

Inspect the O-ring for cuts or gaps.



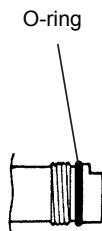
CAUTION

- If the O-ring is positioned incorrectly or chaps exist on its surface, water can get into the joint area between the scope and optical adapter which may cause malfunction or damage. In some cases, the illumination does not light.
-

6-mm type

The O-ring on the 6-mm type is on the distal end of the scope.

On the 6mm type, if the o-ring is not present then the area is colored yellow and will therefore be visible.

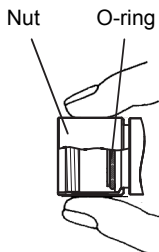


CAUTION

- On the 6-mm type, if the O-ring is cut, nicked or shows any abnormality, put silicon grease on the spare O-ring provided with the optical adapter and replace the abnormal O-ring with the spare O-ring. You should periodically replace the O-ring.
-

4-mm type

The O-ring on the 4-mm type is in the optical adapter.



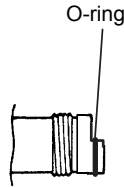
CAUTION

- Since user inspection of the 4 mm type is difficult you should have it inspected periodically by Olympus.
-

6.2-mm type (with channel)

The O-ring on the 6.2-mm type is on the distal end of the scope.

On the 6.2-mm type, if the o-ring is not present then the area is colored yellow and will therefore be visible.

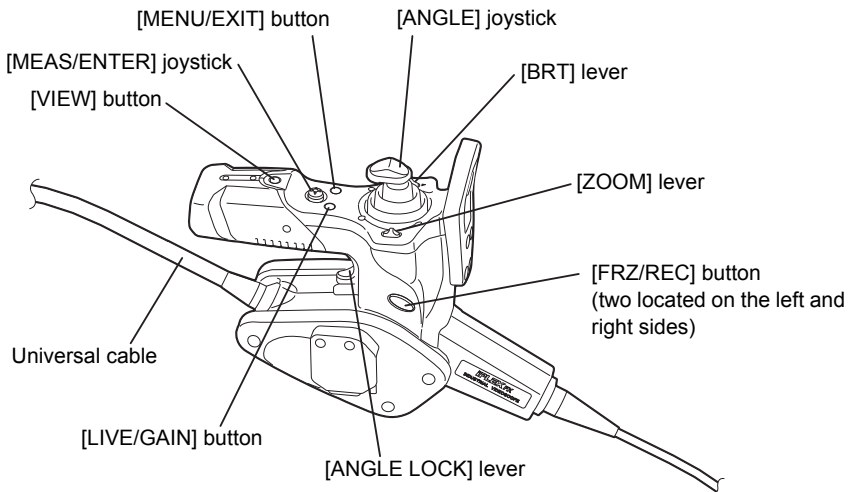


CAUTION

- On the 6.2-mm type, if the O-ring is cut, nicked or shows any abnormality, put silicon grease on the spare O-ring provided with the optical adapter and replace the abnormal O-ring with the spare O-ring. You should periodically replace the O-ring.

■ Inspecting the control unit and the universal cable

- 1 Check for irregularities such as damage or deformation to the external material, buttons, joysticks, and levers.**
- 2 Ensure that the universal cable is free of irregularities such as cuts and buckling.**



■ Inspecting the channel port (IV8635X1 only)

- 1** Check that the chuck screw is not abnormally deformed, has no foreign object attached to it, and can be rotated smoothly.
- 2** Check that the projections and planes are not deformed and have no foreign objects attached.
- 3** Check that the safety cap is attached.
- 4** Check that other parts are not loose.

■ Inspecting the channel (IV8635X1 only)

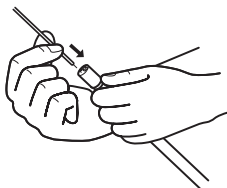


CAUTION

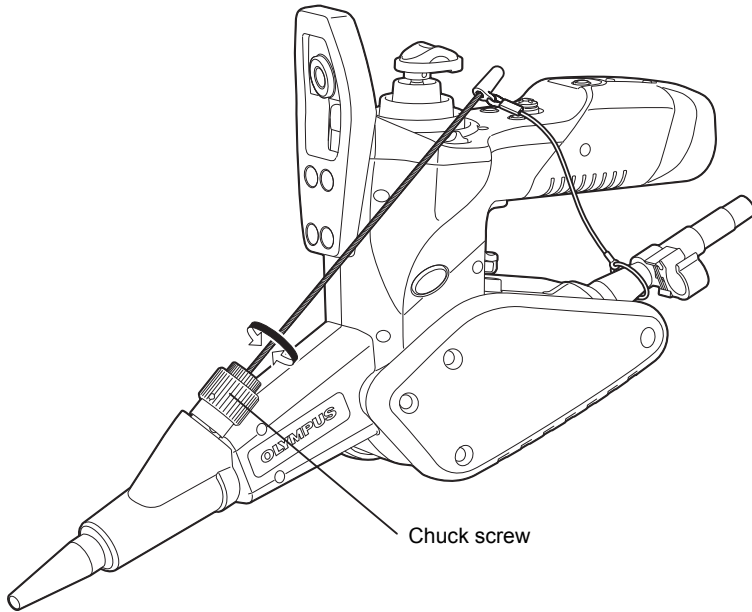
- To avoid damaging the scope and hook assembly, do not force the hook assembly into the scope if strong resistance is encountered.
- Be sure to insert the hook assembly from the distal end of the scope. Do not attempt to insert it from the channel port. This may damage the scope and hook assembly.

Insert the hook assembly into the channel opening at the distal end of the scope. Make sure that the hook assembly exits smoothly from the channel port.

- 1** Loosen the chuck screw on the channel port so that the hook assembly can be passed through it.
- 2** Straighten the insertion tube of the scope as much as possible.
- 3** While holding the scope near the distal end, gently insert the hook assembly from the proximal end, and make sure the hook assembly moves smoothly out of the channel port.



- 4** Make sure that the hook assembly can be clamped and released by tightening or loosening the chuck screw of the hook assembly.



■ Inspecting/replacing the safety cap (IV8635X1 only)

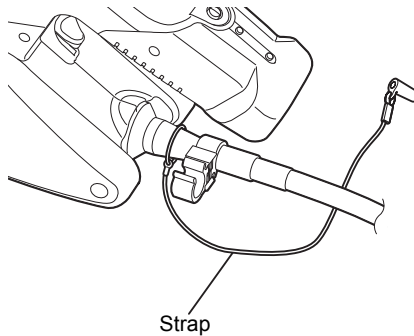
Inspecting the safety cap



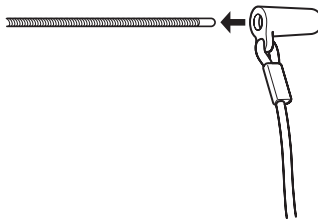
CAUTION

- If the safety cap cannot be attached securely to the end without the hook of the provided hook assembly or if there is any other irregularities such as break of the strap, replace the safety cap with the spare. The safety cap can be replaced with the procedure on the following page.

- 1 Make sure that the strap of the safety cap is attached to the universal cable. Make sure that the strap is free of irregularities.**

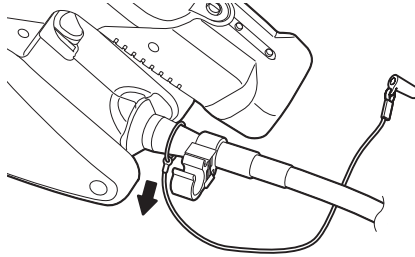


- 2 Make sure that the safety cap is attached securely to the end of the hook assembly.**

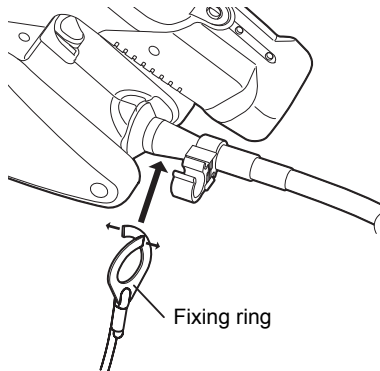


Replacing the safety cap

- 1** Holding the strap, firmly pull the safety cap from the universal cable and separate the fixing ring.



- 2** Open the fixing ring on the new safety cap, and attach to the universal cable in the position shown in the following diagram.



3.6 Preparation of the hook assembly (IV8635X1 only)

■ Inspecting the hook assembly



WARNING

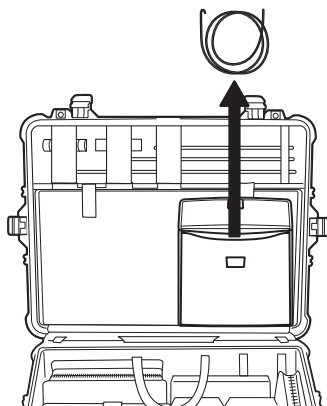
- Be extra careful when handling the hook assembly to avoid connecting your eye with the tip.



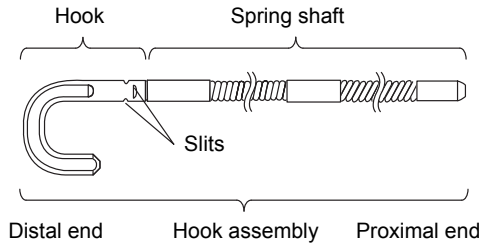
CAUTION

- Be sure to inspect the hook assembly every time it is used. If you suspect an anomaly, use a spare.
- Do not loosen the hook once it is attached to the spring shaft. If the hook is loose, replace it with a new one. A loose hook can easily fall off (see “■ Attaching the hook to the spring shaft” (page 49)).

- 1** Take out the hook assembly from the hook assembly housing in the carrying case. Take care when extending the hook assembly so that it does not hook something.



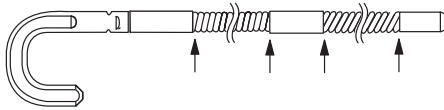
2 Make sure that the hook assembly is composed of the spring shaft and the hook attached to it.



CAUTION

- If the hook becomes trapped or caught in the inspection object, the hook will break at the slit portion in order to allow scope withdrawal. Therefore, do not subject the hook to excess force.

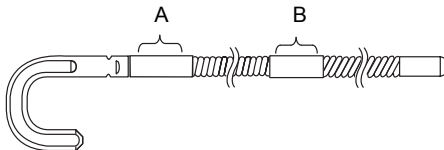
3 Make sure that the hook assembly is free from irregularities such as buckling, stretching, part separation, crushing and excessive bending.



CAUTION

- To prevent the spring shaft from being damaged or disconnected, pay particular attention to the connections indicated by the arrows in figure above when performing the inspection described below.

4 Hold the spring shaft at A and B as shown in figure below and pull ends away from each other to check that the wires inside the shaft limit coil extension when stretched to a certain point.



5 Confirm that the hook is not damaged and that it is securely attached to the distal end of the spring shaft.

■ Attaching the hook to the spring shaft



WARNING

- Be careful in handling the hook assembly so as not to avoid contact with your eye.



CAUTION

- Do not use the hook once detached from the spring shaft.

The hook is replaceable. To attach hook to the spring shaft, follow the procedure below.



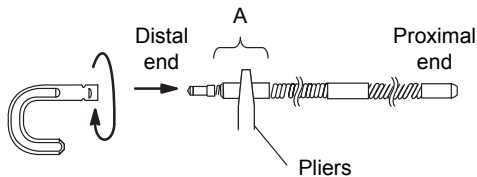
CAUTION

- If the hook is attached incorrectly, it can easily fall off. Read the following procedure carefully before trying to attach the hook.

- 1 Check the screw thread at the distal end of the spring shaft. If the end screws rattle or are misaligned, do not use the spring shaft and use spare parts instead.**



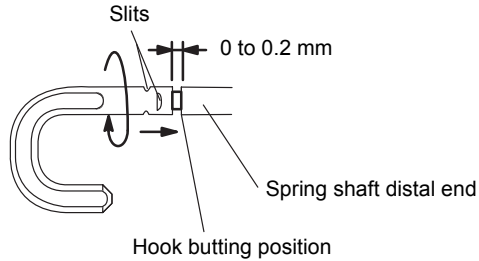
- 2 While gripping A in figure below with pliers, push the hook straight over the spring shaft until it stops.**



CAUTION

- After the hook hits the butting position, do not try to screw it in any further. Otherwise, hook and the screw thread at the distal end of the spring shaft may be damaged.
- Do not loosen the hook once it is attached to the spring shaft. If the hook is loose, replace it with a new one. A loose hook can easily fall off.

- 3** While pressing the hook straight against the spring shaft, slowly turn the hook clockwise to screw it onto the spring shaft. The gap between the hook and butting position is 0 to 0.2 mm.



CAUTION

- Screw the hook all the way in. It may be a little stiff because there are no threads cut in the thread hole.
 - If it is not possible to screw the hook onto the spring shaft, or if the hook easily detaches from the spring shaft, the service life of the spring shaft has expired. In this case, use a new hook assembly.
-

3.7 Inspecting the optical adapter

■ Inspecting the optical adapter optics and connecting screw threads

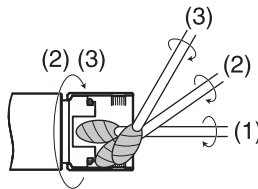
- 1** Check that there is no dirt or water on the inner and outer of the objective lens and the electrodes. If dust or water is present, wipe them clean with a soft piece of gauze, a cotton swab, or a sweep them off with a brush. In case of cleaning during the optical adapter attaching to the distal end of the scope, hold the hard part of the distal end. The best results may be obtained using the lens cleaning fluid provided in the lens cleaning kit.



CAUTION

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

- 2** Make sure that there are no deformities or foreign objects in the threads of the screws of the optical adapter. Moisten a cotton swab with cleaning fluid and continue cleaning until doing so leaves no dirt on the cotton swab. Clean in the order shown in the diagrams, (1), (2), (3). 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 waterproofing between the optical adapter and the scope's distal end.
 - Cleaning should be done periodically in order to maintain water resistance.
-

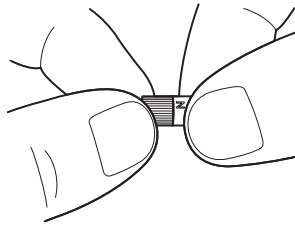
■ Inspecting the parts of the optical adapter

Check that the parts of the optical adapter are not loose.



CAUTION

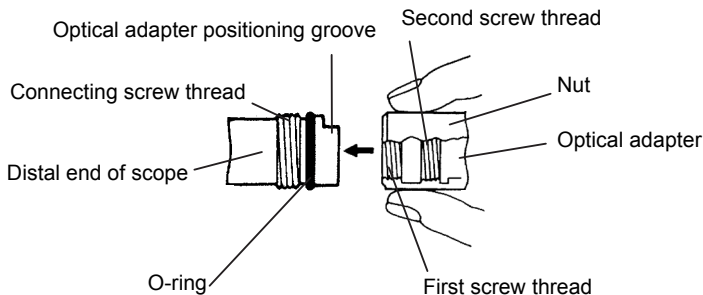
- Never use it if any parts are loose. Otherwise, the loose part may fall into the inspection object.
-



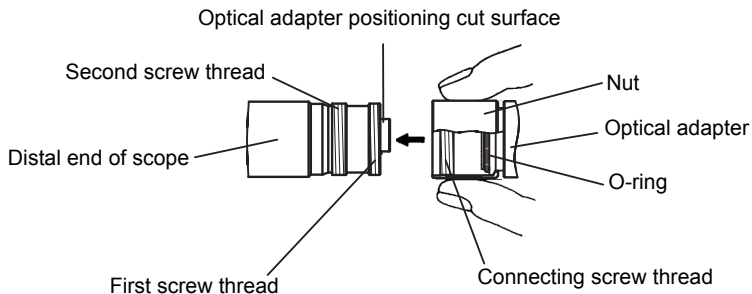
■ Attaching and detaching the optical adapter

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

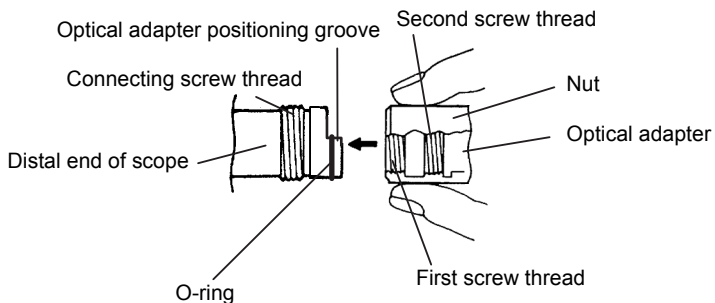
6-mm type



4-mm type



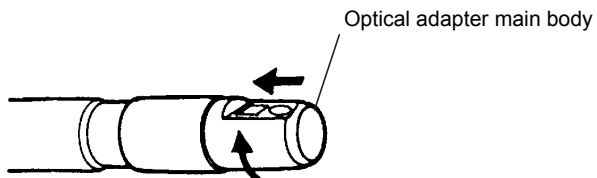
6.2-mm type (for IV8635X1)



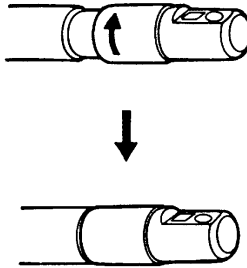
- 2** Turn the optical adapter nut clockwise until the first screw thread passes over the connecting screw thread.



- 3** Once past the first screw thread, turn the entire main body of the optical adapter clockwise while pushing gently until it fits into the positioning cut surface on the scope's 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 is stops.



- 5** To remove the optical adapter, repeat these steps in reverse order.



CAUTION

- If you cannot mount or remove the optical adapter because the nut will not turn, stop using it and contact Olympus.
- The optical adapter is a precise instrument using glass components in the optical system. Do not drop it or hit it against hard surfaces.



NOTE

- The optical adapter is designed for safety with a double-screw construction to prevent it from falling off.
-

3.8 Inspecting the LCD monitor

■ Inspecting the external appearance

- 1** Check that the LCD monitor is free of irregularities such as cracks on the screen and holding section deformations.
- 2** Check that the LCD monitor can be tilted smoothly.

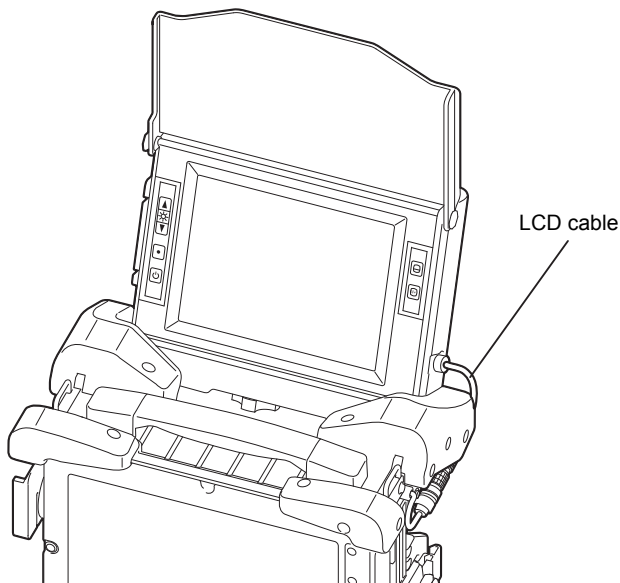


NOTE

- The LCD panel is fabricated based on precision technologies. The LCD panel may contain pixels that do not light (visible as black dots) or light permanently (visible as bright dots), but this is not a defect or malfunction of the product.

■ Inspecting the LCD monitor holding section and LCD cable

- 1** Check that the LCD monitor holding screws are not loose and are firmly held.
- 2** Check that the LCD cable is free of irregularities and that it is connected to the LCD monitor.





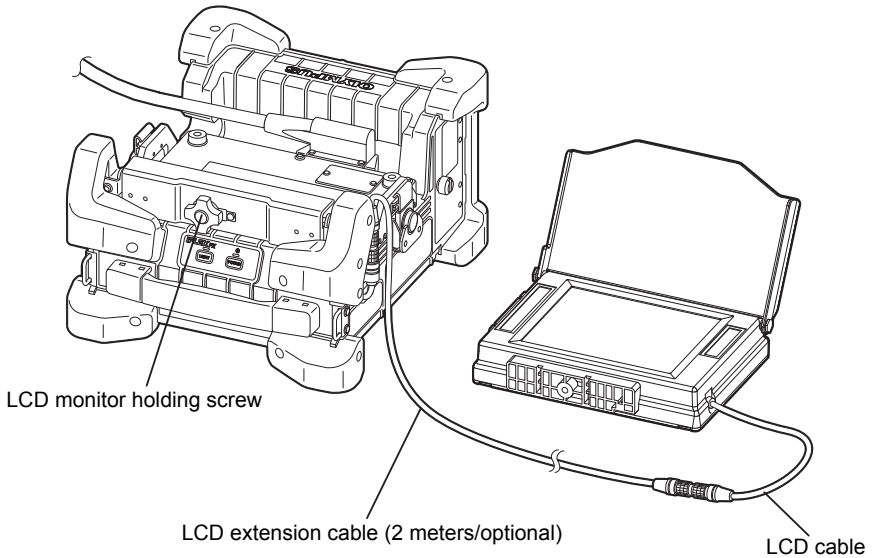
CAUTION

- Do not touch the connector with wet hands.



NOTE

- The LCD monitor can be removed from the base unit and used by using the optional LCD extension cable. To remove it, first remove the LCD cable from the LCD monitor and then loosen the LCD monitor holding screws. Next, connect the LCD extension cable to the LCD cable.



- The LCD monitor can be mounted on a commercially available tripod.
 - The LCD monitor image may appear somewhat darker when the LCD extension cable is being used. This is not malfunction.
-

3.9 Attaching and detaching the strap

When you want to hang the base unit from your shoulder, attach the shoulder strap. Be careful not to use a shoulder strap other than those designated by Olympus.



WARNING

- Never attempt to carry an object other than the base unit using the shoulder strap. Otherwise, the strap may be damaged and cause the base unit to drop.
- Be sure to check that the shoulder strap is free of irregularities such as frayed fibers and damaged metal parts before use.
- Do not use the shoulder strap in a manner that is subjected to an excessive load by, for example, swinging the base unit or placing a heavy object on the instrument.
- When using the shoulder strap, be careful not to hit the base unit against other objects.
- When using the shoulder strap, be careful not to bring it in direct contact with your skin. Otherwise, there will be a risk of low-temperature burns on your skin due to the heat of the instrument may result.

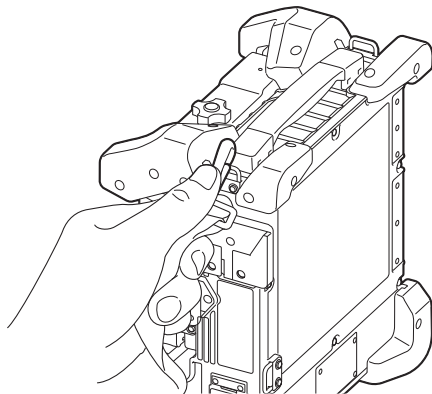


CAUTION

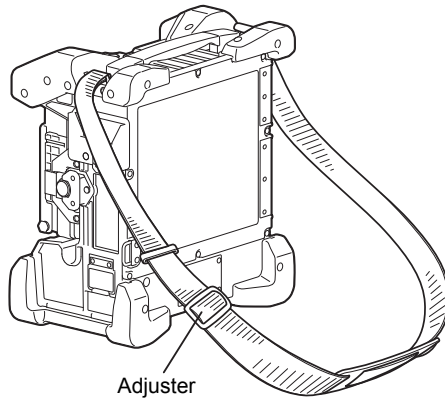
- Do not store the base unit by hanging it from something. Otherwise, the strap may be damaged.
- Be sure to check that the hook levers of the strap are returned to their original positions. Otherwise, the base unit may drop when you attempt to carry it.

■ Attaching the strap

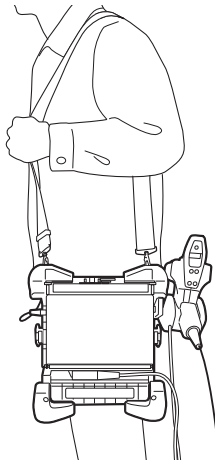
- 1** While pushing on the hook lever of the shoulder strap, engage the hook with the strap ring of the base unit.



2 Adjust the length of the shoulder strap using its length adjuster.



3 Use the shoulder strap to hang the base unit from your shoulder.

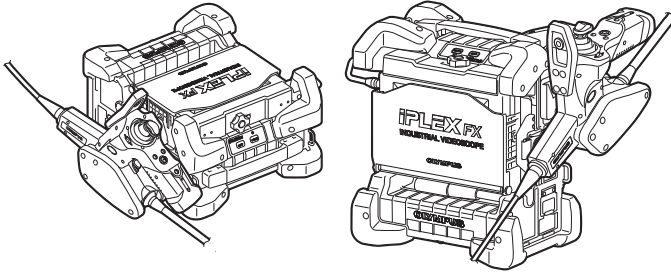


■ Removing the strap

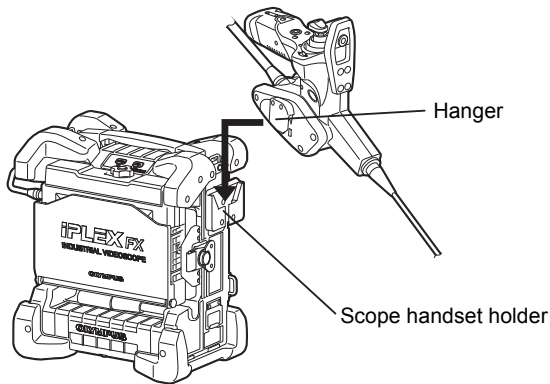
To remove the strap; while pushing the hook lever of the shoulder strap with your finger, remove the strap from the strap ring of the base unit.

3.10 Installation of the control unit on the base unit

The control unit can be attached to the base unit as desired. It can be attached to the base unit for carrying and left attached to the base unit during observation.



- 1 Fit the hanger on the side of the control unit into the scope handset holder on the side of the base unit. The hanger may not fit correctly at an angle into the scope handset holder, be sure to put it straight into the scope handset holder.



- 2 Push in the hanger until you feel a click. If it is not inserted completely it may come off too easily.
- 3 When detaching the control unit from the base unit, pull the control unit straight upward from the base unit.



CAUTION

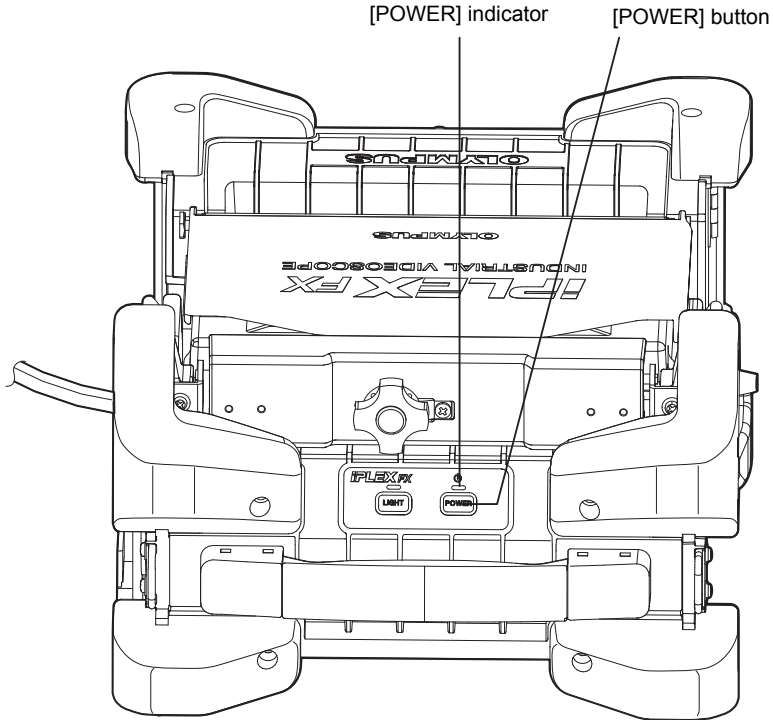
- Take care not to tilt or swing the base unit when carrying it with the control unit attached. Doing so may cause the control unit to detach and drop from the main unit.
 - When putting down the base unit while the control unit is attached to it, always place it on its side or base. Otherwise, the control unit and/or scope may be damaged.
-

Chapter 4 Basic operations

4.1 Turning on the power

■ Turning the power on

- 1** Press and hold the [POWER] button on the base unit for 2 seconds, the POWER indicator lights so you can check if the power is on.



NOTE

- Also ensure that the [POWER] button of the LCD monitor is turned on.
-

Turning off the power

Press and hold the [POWER] button on the base unit for one second to turn off the [POWER] indicator.



NOTE

- The power turns off about 3 seconds after pressing the [POWER] button.
-

■ Checking the LCD monitor image

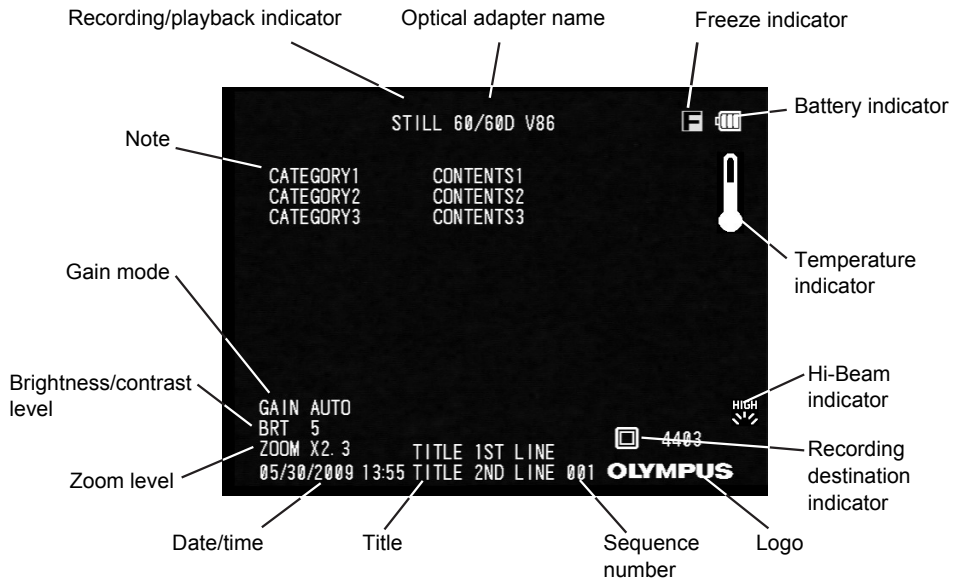
- 1 Open the shade of the LCD monitor and ensure that the LCD monitor displays the observation image.
- 2 Make sure there are no dark patches or dirt in the image. If you find any irregularities, go back to “3.5 Inspecting the scope” (page 39) and “3.7 Inspecting the optical adapter” (page 51) to check it again.



NOTE

- The screen displays and menu operations are enabled approximately 40 seconds after the [POWER] button is pressed.
- When the language setting is changed, the time taken until the screen display functions, such as menu selection, may be longer than before. This is not a malfunction.
- When using the stereo optical adapter, the positions of the left and right images may not line up either horizontally or vertically depending on the combination of optical adapter and scope. However this is not a malfunction.
- The displayed title is the title that was entered on the Live screen the last time the system was used.

■ Indicator display



■ Display language setting

Select the language to be used for menus and other display text before using the system for the first time. For more information, see “Language selection” (page 113).

■ Date and time settings

Set the current date and time before using the system for the first time. For more information, see “Setting the date and time” (page 112).

■ Setup of the optical adapter

The stereo optical adapter list is displayed on the live screen when the stereo optical adapter is attached. Select the optical adapter you are using from this list, press the [MEAS/ENTER] joystick (“Stereo optical adapter selection” (page 132)).

If a normal optical adapter (single lens) is attached, it will be automatically recognized (see “Attaching the optical adapter” (page 155)).



CAUTION

- The types of normal optical adapters are displayed. If it is incorrect, reattach the optical adapter or see “Changing the selection of the optical adapter” (page 110) to set it manually.

■ Checking the illumination lighting



WARNING

- The illumination emitted from the scope distal end may heat and ignite a nearby object. Be sure to set the illumination light turn off the [LIGHT] button on the front panel of the base unit when not using the instrument.
- Do not allow the light emitted from the scope's distal end enter your eye directly. Otherwise, an eye injury may result.

1

Attach the optical adapter firmly to the scope.

See “Inspecting the optical adapter” (page 51) for the procedure to attach it.

2

Ensure that the [LIGHT] indicator on the front panel is lit. If not, press the [LIGHT] button to light the indicator.

3

Verify the light is emitted from the scope to ensure that the light source is turned on.

4 To increase the amount of illumination with the light turned ON, press and hold the [LIGHT] button for at least 2 seconds.

Confirm that the light emitted by the scope is increased and that the Hi-Beam indicator is on the indicator display.



CAUTION

- The above operation is not possible when the temperature of the distal end of the scope is too high.
 - If the distal end of the scope gets too hot while the light is set to high, the scope automatically returns the light to normal.
 - Immediately after pressing and holding the [LIGHT] button the Hi-Beam indicator may flash, but this is not a malfunction. The indicator stops flashing after a short time and stays lit.
-

5 To return the amount of light to normal, press the [LIGHT] button once while the scope's light is set to HIGH (the Hi-Beam indicator is ON).

Check that the amount of light has returned to normal, and that the Hi-Beam indicator on the display has disappeared.

■ White balance adjustment

Adjust the white balance of the scope as required by following the procedure described in “Live screen/frozen screen menu display and functions” in “W BALANCE” (page 96).

Adjust the white balance after replacing the optical adapter.

■ Checking the angulation functions

1 Straighten the scope unit's insertion tube.

2 Manipulate the [ANGLE] joystick slowly and ensure that the angulation section moves smoothly.



CAUTION

- Repair is required if the joystick shaft is bent or if the knob comes off. Contact Olympus.

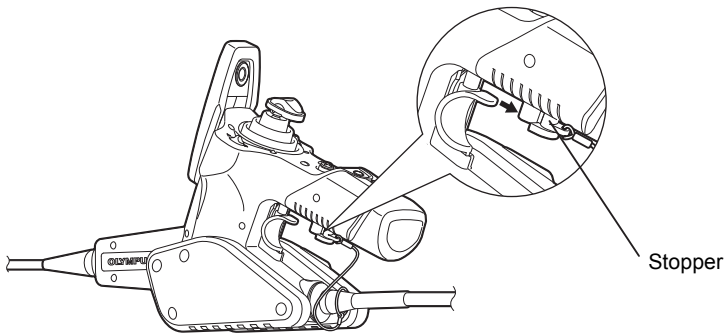


NOTE

- The angulation movement is interlocked with the angle and direction of the [ANGLE] joystick movements.
-

■ Checking the angulation lock

- 1 Remove the stopper.



- 2 While the [ANGLE LOCK] lever is pulled out and locked, confirm that angulation remains locked even when you remove your finger from the [ANGLE] joystick.
- 3 Confirm that the [ANGLE LOCK] lever unlocks when you press it down again.
- 4 If you are unable to operate the angulation lock, it means that a stopper is installed. The stopper keeps the [ANGLE LOCK] lever from being raised inadvertently.



CAUTION

- The [ANGLE] joystick may allow to control the articulation portion of insertion tube precisely while the [ANGLE LOCK] lever is pulled. However, if the [ANGLE] joystick of the control unit is handled heavily, it may cause malfunction.
- While the angle is locked by pull up the [ANGLE LOCK] lever, the “LOCK” label shows up on the [ANGLE LOCK] lever. If the operation of articulation getting heavier during operation, please check the “LOCK” label is shown or not. If the “LOCK” is shown, by pull down the [ANGLE LOCK] lever to release the [ANGLE LOCK] status which will then get back to normal mode.
- Take care not to lose the stopper.

4.2 Attaching the hook assembly (IV8635X1 only)

Insert the hook assembly from the channel opening at the scope's distal end as described below.



WARNING

- Be careful in handling the hook assembly so as not to avoid contact with your eye.
- Do not insert the hook assembly when the light source is on.
- Use the hook assembly only where specified in the inspection manual. Never attempt to use the hook assembly when there is a risk of a dropped hook damaging the object being inspected. Do not use the hook assembly for sites not specified in the inspection manual. If no inspection manual is provided, do not use the hook assembly. If the hook gets caught inside the object, you may not be able to withdraw the scope or the hook may fall off inside the object.



CAUTION

- Before inspection, read the appropriate inspection manual.
 - Do not insert anything into the channel other than the tools recommended by OLYMPUS.
-

- 1 Loosen the chuck screw on the channel port so that the hook assembly can be passed through it.**
- 2 Straighten the scope's insertion tube as much as possible.**
- 3 While holding the scope near the distal end, gently insert the hook assembly's proximal end into the channel opening at the scope's distal end.**



CAUTION

- Be sure to insert the hook assembly from the distal end of the scope. Do not attempt to insert it from the channel port. This may damage the scope and hook assembly.
 - Wipe the dirt, oil, water or any other sticky substance from the hook assembly before insertion.
 - Do not forcibly insert the hook assembly into the scope if strong resistance is encountered.
-

- 4 Insert the hook assembly until the distal hook rests against the distal end of the scope in the retracted position.**



CAUTION

- Do not adjust the angle when the hook assembly is protruding 150 mm or more from the tip of the scope. There is a risk of damage to the scope.
-

5

Attach the safety cap to the proximal end of the hook assembly.



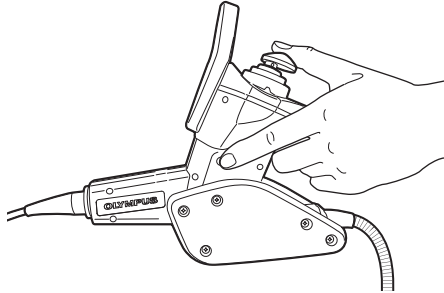
WARNING

- Always be sure to attach the safety cap to the proximal end of the hook assembly before operating the scope. This protects the operator's eye from injury.
-

4.3 Inserting the scope

■ Holding the control unit and scope

- 1** In general, the [ANGLE] joystick of the control unit is manipulated with the thumb of the hand holding the grip of the control unit.



- 2** Other buttons are also to be manipulated with the fingers of the hand holding the grip of the control unit.
- 3** Hold the insertion tube with the other hand to which the control unit is being held.

■ Inserting the scope

While observing the monitor screen, confirm the correct insertion direction and insert the scope slowly. Perform the angulation operation as required during insertion. Be careful not to apply excessive pushing force, twisting or tension to the insertion tube.



WARNING

- It is designed for safety with a double screw construction. If the optical adapter starts to become detached from the distal end of the scope, the illumination will cease and a message will be displayed, as shown below. The optical adapter may fall off the scope if used in this condition. In this case, immediately stop the inspection, withdraw the scope carefully and secure the optical adapter as described in the operating procedure.



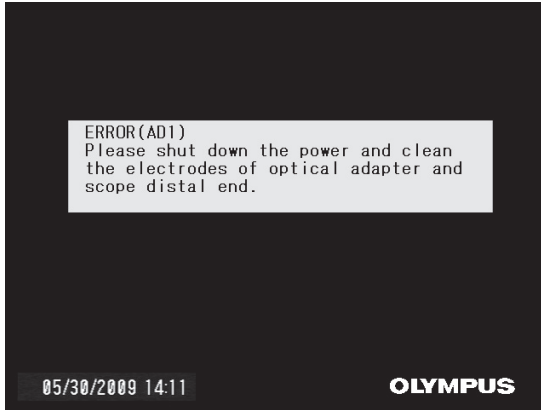
If the optical adapter is not properly attached

- Be sure to turn the illumination light on during insertion into the object being examined. The illumination light does not light if the optical adapter is not correctly attached to the distal end of the scope.
- Read and understand the contents of “Important Information – Please Read Before Use” (page 4) before using the scope. In case of any questions, contact Olympus.



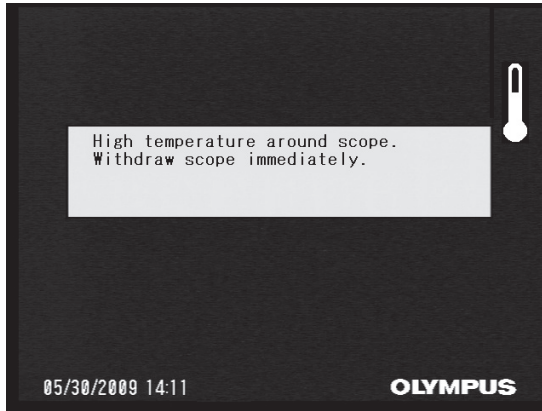
CAUTION

- The message shown below may display when the illumination goes off and the observed image becomes dark during an inspection. This indicates that there is problem with the electrodes caused by foreign matter in between the optical adapter and the scope distal end. In this case, immediately stop operation, gently remove the scope and follow the instructions on page 171 under “Error messages”. It is present may cause damage to the optical adapter or the scope distal end.



- Using the system under any conditions other than those specified in “Operating Environment” in “Chapter 10 Specifications” (page 180) in the instruction manual may cause unexpected accidents that may damage the scope.
- The amount of screen noise may increase under high ambient temperatures.
- A yellow temperature indicator is displayed when ambient temperature is about 80°C to warn you that it is approaching the upper limit.

- Whenever the red temperature indicator and a temperature warning message appears along with an audible warning alarm, immediately withdraw the scope from the object of observation. Continued use risks damage to the insertion tube and the optical adapter, resulting in malfunction and reduced illumination.



- If any irregularities are found with the scope operation or other things during the scope insertion, do not insert the scope any further. If this happens, (release the angulation lock if it is locked) remove your finger from the [ANGLE] joystick, return the angulation section to center position and slowly remove the insertion tube.

■ Angulation operation

- 1** The scope should be angulated as required for guidance or observation. See “Checking the angulation functions” (page 64) for details about angulation operation.



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.

■ Adjusting the LCD monitor brightness

- 1** Press the [BRIGHT] button on the LCD monitor to adjust the brightness as required.



NOTE

- If there is an extremely bright area in the image, vertical noise bands may appear.

4.4 Withdrawing the scope



WARNING

- The distal end of the scope becomes hot just after use in high-temperature atmospheres. Do not touch it directly to avoid burns.

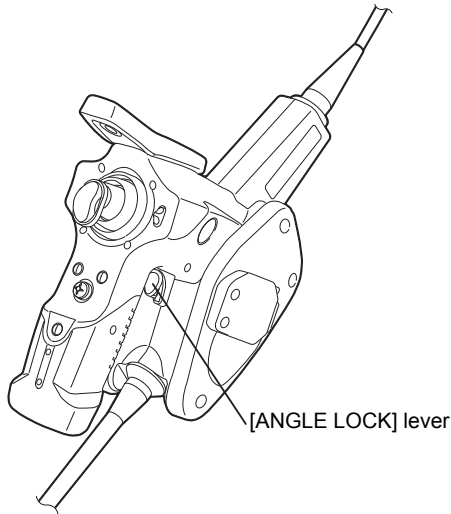


CAUTION

- Do not withdraw the scope while its angulation is locked or while your finger is placed on the [ANGLE] joystick. Otherwise, the scope and/or observation target may be damaged.
 - If the scope is caught by something during withdrawal, turn the control unit gently while continuing the withdrawal. Do not use excessive force to avoid damaging the scope or the object you are inspecting.
-

■ Releasing the angulation lock

If the angulation lock is activated, press the [ANGLE/LOCK] lever to release it.



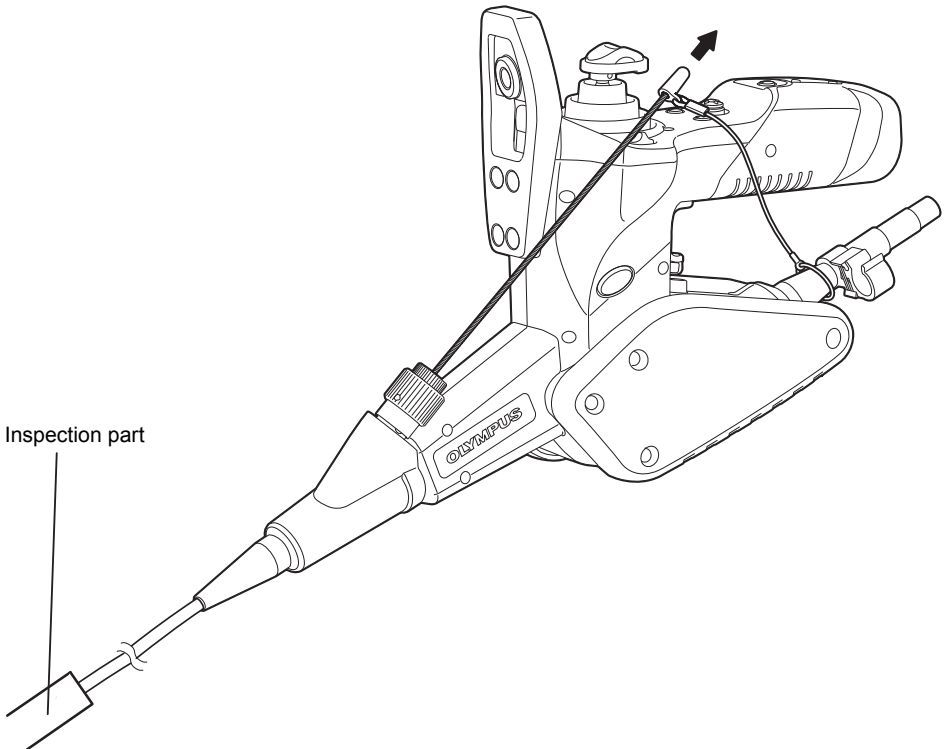
■ Withdrawing the scope

Remove your finger from the [ANGLE] joystick and carefully observe as you withdraw the scope.

■ Troubleshooting when the hook is caught (IV8635X1 only)

Protrude the hook assembly from the scope's distal end and turn the hook assembly to unhitch the hook. If withdrawal is still impossible jettison the hook from the spring shaft according to the following procedure.

- 1** Firmly tighten the chuck screw of the channel port to securely fix the hook assembly.
- 2** Pull the control unit slowly and forcefully so that the insertion tube and bending section are straight. The hook will fall off the spring shaft.





CAUTION

- When jettisoning the hook the scope may be damaged, accordingly jettisoning the hook should only be done as a last resort to dislodge a hook that is caught. Any damage caused by jettisoning the hook is not covered under warranty and repairs are the responsibility of the owner.
-

3 After the hook has been jettisoned, do not retract the distal end of the spring shaft into the channel. Gently withdraw the scope, with the spring shaft distal end visible within the field of view.



NOTE

- When the hook breaks at the hook slits and falls off, a part of the broken hook remains attached to the spring shaft. Remove the remaining part by turning the spring shaft in the opposite to the direction the hook was screwed onto the spring shaft. As mentioned in “■ Attaching the hook to the spring shaft” (page 49), grip the distal end of the spring shaft with a pair of pliers. Taking care not to scratch the spring shaft’s screw thread, lightly grip the remains of the hook with another pair of pliers and turn. The remaining part can be easily removed.
-

4.5 Adjusting the image

■ Still image (freeze)



CAUTION

- Do not insert and withdraw the scope when the image is frozen.

1

Press the [FRZ/REC] button on the side of the control unit to freeze the observed image. The LCD monitor displays the freeze indicator (**F**) on the top right of the screen.



NOTE

- If the [FRZ/REC] button is held depressed for more than 2 seconds, image recording will be initiated.

2

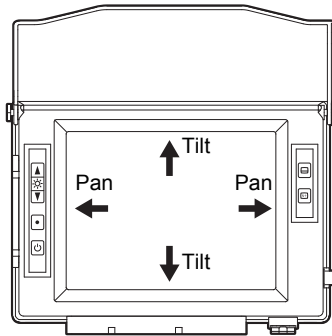
When the observation image is frozen, press the [FRZ/REC] button again or the [LIVE/GAIN] button to return to a live image.

3

When an image containing quick action is frozen, the frozen image may be blurred. Further, when the “NOISE REDUCTION” setting (page 94) is “HIGH”, ghosting is more likely to appear. Change the setting to “STANDARD” to reduce ghosting.

■ Zoom

- 1** When the live image is displayed, tilt the [ZOOM] lever on the control unit toward [T] to zoom (magnify) the observation image. The zoom level will be displayed for about 3 seconds on the monitor screen. While the zoomed image is displayed, the LCD monitor displays “ZOOM” to indicate that image zooming is activated.
- 2** To return to the original image size, tilt the [ZOOM] lever toward [W].
- 3** The zoomed image can be panned (left/right) and tilted (up/down) by tilting the [MEAS/ENTER] joystick.



NOTE

- Images are zoomed in by means of “electronic zooming”. As a result, the image may become slightly coarse when the zooming ratio is increased.
 - When the stereo optical adapter is attached, move the [MEAS/ENTER] joystick to the left (right) while the image is not zoomed to magnify the left (right) side of the screen to full screen display. “LEFT (or RIGHT)” is displayed during magnified display of the left (or right) half of the image. In this condition you can move the [MEAS/ENTER] joystick to the right (left) to unzoom the image. If an optical adapter other than the stereo optical adapter is attached, zooming is not done when the [MEAS/ENTER] joystick is moved to the left (right).
-

■ Adjusting the brightness

The brightness can be controlled either by “GAIN mode switching”, “Automatic brightness control” or “Contrast correction”.

1 GAIN mode switching

Press the [LIVE/GAIN] button on the control unit while the live image is displayed. This switches the image’s GAIN mode. When this operation is performed, the monitor screen shows the GAIN mode for about 3 seconds. Switch the GAIN mode if the image is noisy or there is a dark area and you want to make the image brighter.

The following four GAIN modes are available.

Mode	Description
NORMAL	Standard GAIN mode.
AUTO	The mode used to automatically change dynamic range when BRT is interlocked. Note that this mode may be accompanied with increased noise depending on the BRT setting.
WiDER1	The mode to use when a brighter image than is possible in STANDARD mode is desired. Note that this mode may be accompanied with increased noise under certain observation conditions.
WiDER2	The mode to use when a brighter image than is possible in WiDER1 mode is required. “WiDER2” further expands the dynamic range so that dark positions can be observed. But the noise may increase under certain observation conditions.

2 Automatic brightness adjustment with the [BRT] lever

While the live image is displayed, tilt the [BRT] lever on the control unit toward [▲] to brighten the overall image or toward [▼] to darken it. When the image brightness is adjusted, the LCD monitor displays the level indicator for about 3 seconds.

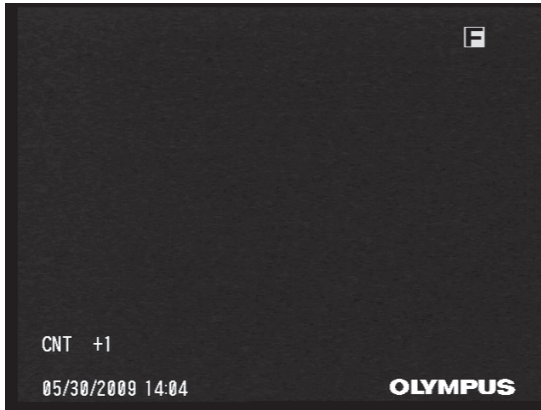
Use the [BRT] lever when you want to change the overall brightness of the image.

3 Contrast correction with the [BRT] lever

During display of a frozen or retrieved image, operating the [BRT] lever on the control unit allows the contrast to be corrected in five steps.

When the contrast correction level is “0”, an image without contrast correction is displayed. When the contrast correction level is “1” or “2”, correct the contrast by increasing the image brightness.

When the contrast correction level is “-1” or “-2”, correct the contrast by decreasing the image brightness. When the contrast is corrected, the monitor displays the contrast correction level for about 3 seconds.



4.6 Recording the image

■ Image recording preparation

The recording card or USB memory should always be formatted on the base unit. See “Format recording card/internal memory/USB memory” (page 127) for the operating procedure.



CAUTION

- If the recording card or USB memory is removed during image or audio recording, the data in the recording media may be destroyed. Never attempt to remove the recording card or USB memory while recording images or audio.
- The CF (Compact Flash) card is a sensitive component and may be damaged by static electricity. Discharge static electric charges before using a CF card.

The following table shows the size of a single image and the approximate numbers of images recordable on the standard CF card provided. Also, the same number of images can be recorded on both the internal memory and the standard recording card provided. The still image recording capacity of the PAL format is about 140% that of the NTSC format.

1 GB recording card capacity estimate (for NTSC)

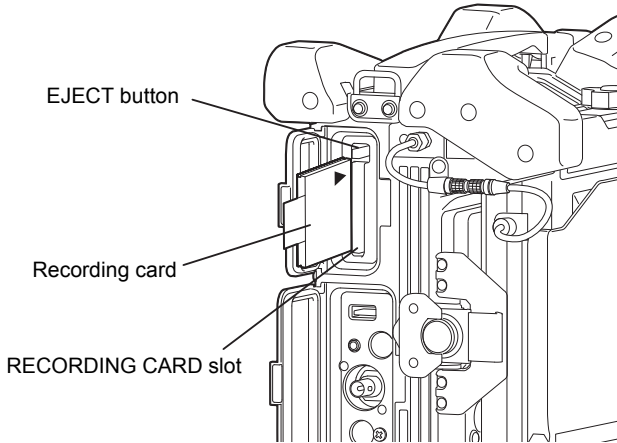
Recording format		Size of a single image	Images per 1 GB card
Still image	SHQ JPEG	350 KB	Approx. 2900 images
	HIGH quality JPEG	300 KB	Approx. 3400 images
	Standard quality JPEG	200 KB	Approx. 5100 images
	Uncompressed TIFF	640 KB	Approx. 1600 images
Moving image (per sec.)*1		Approx. 500 KB	Approx. 30 min.
Audio (per sec.)		Approx. 16 KB	—

*1 This value is the capacity to record moving images when the “MOVIE QUAL” (page 95) is set to “STD:QVGA”.

The setups related to image recording must be set up using “Menu operations”. See “Chapter 5 Menu operations and functions” (page 92) for details about menu operations. See “RECORD” (page 95) for the various settings related to image recording.

1 Insert a recording card

Insert a recording card (CF card) specified by OLYMPUS into the RECORDING CARD slot on the base unit.



CAUTION

- Be sure to insert the recording card into the recording card slot in the orientation shown in the figure above. If the recording card is inserted in the wrong orientation, the recording card and/or the recording card slot may be damaged.



NOTE

- To pull out the card, grasp the tag after pushing the eject button.
-

2 Setup of the image recording format

To setup image recording format, press the [MENU/EXIT] button to display the menu while in the live screen, and use the “RECORD” menu for the setting (see “Live screen/frozen screen menu display and functions” (page 94)).

- To record the displayed date/time, title, logo and measurement results together on the still image, set “ON” in the “PRINT SCREEN” menu (see page 95).
- To record still images, use the “STILL QUAL” menu to select the format of still images.
- If you want to record audio with still images, set the “STILL AUDIO” menu to “ON”.
- Select where to save the file in the “DESTINATION” menu.

**NOTE**

- When “ON” is selected in the “PRINT SCREEN” menu to record still images and a stereo optical adapter is attached, two still images are recorded: one with the displayed date/time, title, logo display, and measurement results and one without. Also, when recording a moving image, the moving image and a still image are recorded with the date/time, title, logo display as well as a still image without. If any optical adapter except a stereo optical adapter is selected, only the still image with the date/time, title, logo display, and measurement results is recorded. When a still image on which the date, title, etc., are overwritten is replayed, the characters of time may be doubled. This is not a malfunction.
- You can select from “SHQ”, “HIGH” or “STD” for optical adapters other than the stereo adapter (TIFF cannot be selected). However, when stereo optical adapter is selected you can select “HIGH” or “TIFF” (SHQ and STD cannot be selected).

3 Setup of the folder

The recorded images are saved in folder \DCIM\???\IV7R1 on the recording card. The question marks “???” in the folder name indicate the 3-digit folder number from 100 to 999. The folder number is also displayed in the thumbnail screen or retrieve screen. When an image is recorded on a recording card that does not have a folder named \DCIM\???\IV7R1, a folder named \DCIM\100\IV7R1 is created automatically on the card. If the image is recorded immediately after the base unit is turned ON or the recording card is inserted, the image will be recorded in the most recently created folder.

To change the folder or drive that images are recorded in, see “To change the folder” (page 89) or “To change the drive” (page 89).

If you want to add or change the name of a folder on the memory card, see “Add/rename/delete folder” (page 124).

4 Note on the filenames

- a. A file named IV7I????.* is created in the selected folder when an image is recorded.
- b. The “????” indicates a 4 digit serial number in the file name “IV7I????”. The file number is a number between 0001 and 9999. When an image is recorded, the filename is assigned a file number one larger than the file with the largest file number already in the folder. For example, assuming that a folder includes image files with file numbers IV7I0001 and IV7I0003, recording an image creates a file named IV7I0004.
- c. “***” is the extension of the filename. When an optical adapter other than the stereo optical adapter is used, recording an image creates an image file with extension .JPG. When the stereo optical adapter is selected in the menu, recording an image creates an image file with extension .JPG or .TIF depending on the file format settings.

When a still image with audio is recorded, an audio file with the same filename as the image file but with extension .WAV will be created together with the image file.

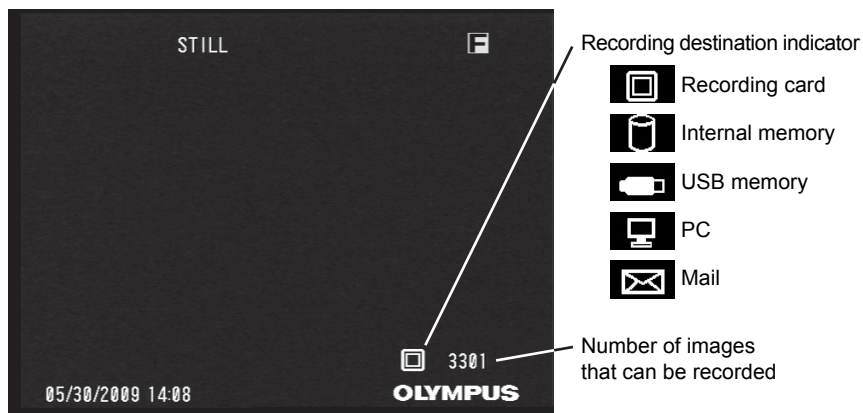
When a moving image is recorded, a moving image file with the same filename as the image file but with extension .AVI will be created together with the image file.

■ Recording a still image

NOTE

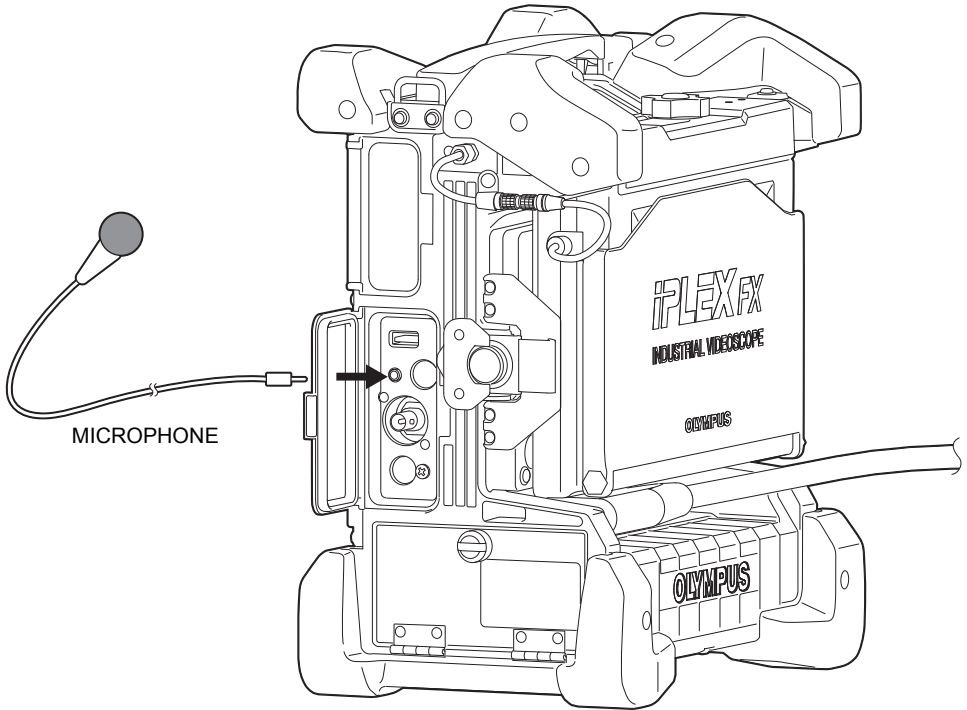
- You can record still images to the recording card provided as standard, to the internal memory, or to a USB memory recommended by Olympus. Contact Olympus for information about USB memories.
- Contact Olympus for details on setting the recording destination for still images to “PC” or “MAIL ONLY”.

Press the [FRZ/REC] button (briefly) on the control unit to freeze the image. While the frozen image is displayed, press the [FRZ/REC] button again for at least two seconds to record the still image in the folder. The screen shows “STILL” during recording of a still image, the screen goes black for a moment and then the frozen image is displayed.



■ Recording audio with still images

- 1** Connect the microphone to the microphone connector. Use a microphone that is recommended by Olympus.
Contact Olympus for information about microphones.



- 2** In the “RECORD” menu, set STILL AUDIO to “ON” (see page 95).

3 Press the [FRZ/REC] button for at least two seconds while the frozen image is displayed.

The still audio recording confirmation window appears after completion of still image recording.



4 To record audio, select “YES” and press the [MEAS/ENTER] joystick.

Audio recording starts.

The screen shows “AUDIO” during recording. The audio is recorded for 60 seconds.

5 To stop recording press the [FRZ/REC] button again.

When the recording completes, “AUDIO” disappears from the screen.



NOTE

- Audio recording automatically ends 60 seconds after it starts. If you want to stop recording, press the [FRZ/REC] button or press either the [LIVE/GAIN] or the [VIEW] buttons.
 - If you select “NO” in the still audio recording confirmation window, the still image will be recorded without the audio.
 - You can record audio with still images to the recording card provided as standard, to the internal memory, or to a USB memory recommended by Olympus. Contact Olympus for information about USB memories.
-

■ Recording a moving image

NOTE

- You can record moving images to the recording card provided as standard, to the internal memory, or to a USB memory recommended by Olympus. Contact Olympus for information about USB memories.
- You can record high-definition moving images by selecting “HIGH: VGA” on the “MOVIE QUAL” menu.

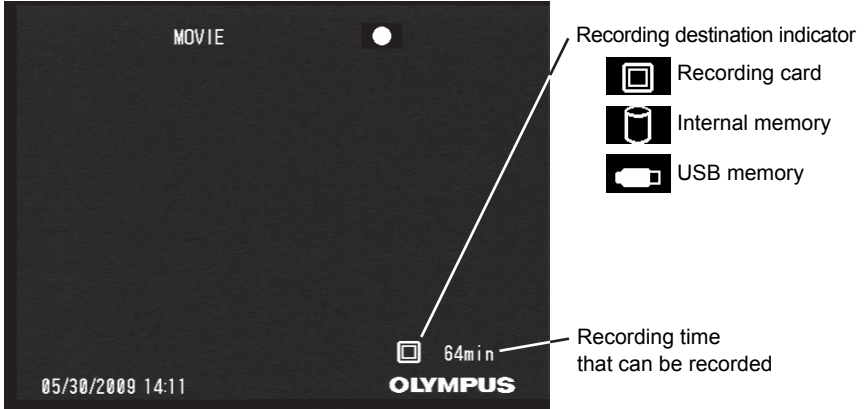
1 Press the [FRZ/REC] button for at least two seconds (long push) while a live image is displayed.

The movie image recording confirmation window appears after completion of still image recording.



2 Select “YES AUDIO ON” for recording audio with the movie or select “YES AUDIO OFF” for recording the movie without audio, and press the [MEAS/ENTER] joystick.

Moving image recording starts. The screen shows “MOVIE” and a flashing red dot during recording of a moving image.



3 To stop recording moving images press the [FRZ/REC] button.

When recording the moving image is complete, “MOVIE” and the flashing red dot disappear from the screen.



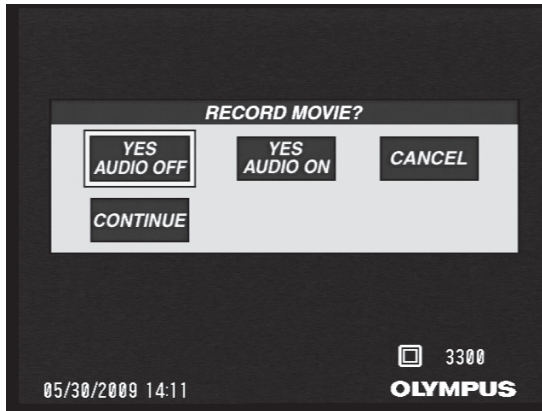
NOTE

- Never attempt to insert or remove the recording card or USB memory while recording a movie. If the recording card or USB memory is removed while recording a movie, movie recording may stop and display error message.
 - Recording stops when the file is 4 GB or if it exceeds the memory capacity. A blank 1-GB memory card provides about 30 minutes of recording time.
 - If you select “NO” in the moving image confirmation window, only the still image is recorded but the moving image is not recorded.
 - You need to connect a microphone in order to record audio with movies.
-

Appending a moving image

You can append newly a moving image to the last moving image. Press the [FRZ/REC] button for at least two seconds (long push) while a live image is displayed. When the moving image confirmation window shown below is displayed, select "CONTINUE" to append the newly moving image at the end of the last recorded movie.

"CONTINUE" is not displayed when the recording media is removed or the [VIEW] button is pressed. The appended movie is recorded with the same conditions as the previously recorded movie.



4.7 Replaying the image

■ Quick replay of most recent image

Press the [VIEW] button in the live screen to display the most recently recorded image in full screen (the retrieve screen).

■ Displaying the thumbnail screen and selecting the image to be replayed

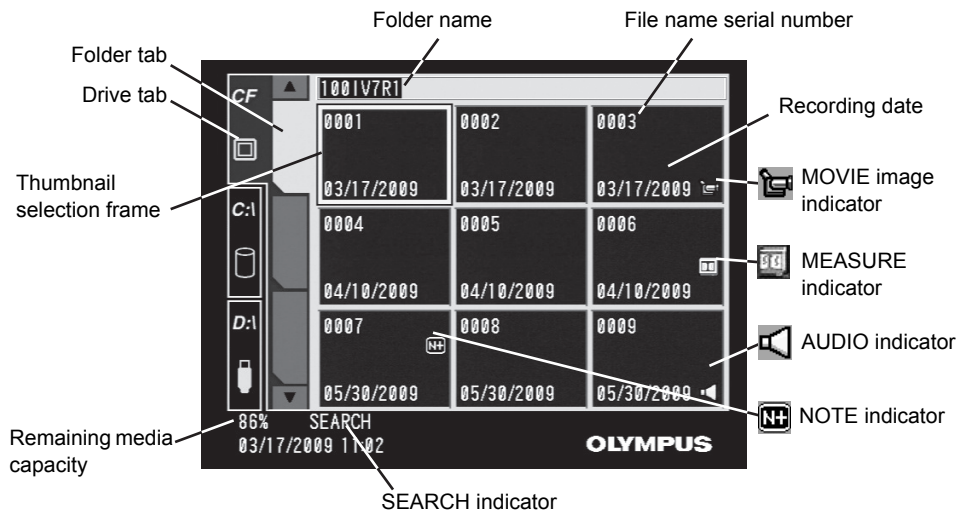
The example describes displaying images recorded on a recording card.

1 Insert the recording card containing the image to be displayed in the RECORDING CARD slot.

2 Press the [VIEW] button for at least 2 seconds to open the thumbnail screen.

The thumbnail screen shows the available recording card capacity in % (see “Remaining media capacity” below).

When searching for an image (see page 122), the search indicator is displayed. The thumbnail screen shows the file name, serial number, and recording date of each thumbnail image. The AUDIO indicator is displayed for still images with audio, the MOVIE indicator is displayed for moving images, the MEASURE indicator is displayed for images with stereo measurement results, and the NOTE indicator is displayed for images with notes (see below).



3 Move the thumbnail selection frame with the [MEAS/ENTER] joystick to select the desired thumbnail image.

If more than nine movies are recorded in one folder and the thumbnail selection frame is on the top (bottom) thumbnail which is the first (last) image in the folder, tilting the [MEAS/ENTER] joystick up (down) moves the thumbnail selection frame to the last (first) image in the folder.

4 To change the folder

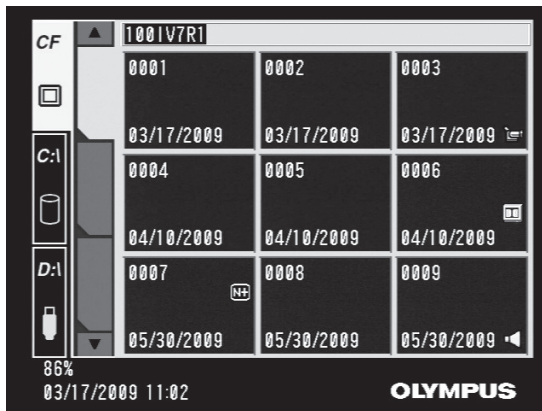
In the thumbnail screen, tilt the [MEAS/ENTER] joystick to the left to select the folder tab when the thumbnail image on the left edge is selected. Then tilt the [MEAS/ENTER] joystick up or down to select the desired folder.

If you want to add or change the name of a folder on the memory card, see “Add/rename/delete folder” (page 124).

When more than four folders have been created, tilting the [MEAS/ENTER] joystick up (down) while the first (last) folder tab is selected, moves to and selects the last (first) folder tab.

5 To change the drive

When a folder tab is selected, tilt the [MEAS/ENTER] joystick further to the left to select a driver tab. Then tilt the [MEAS/ENTER] joystick up or down to select the drive in which to record the image.



Recording destination indicator

 Recording card

 Internal memory

 USB memory



NOTE

- “D:\” is not displayed if a USB memory is not inserted.

6 Image playback (retrieve)

After selecting the desired image with the thumbnail selection frame, push the [MEAS/ENTER] joystick to retrieve the selected image. (Retrieve image)

When the selected image is a moving image, the thumbnail screen is displayed automatically after the movie is finished playing.

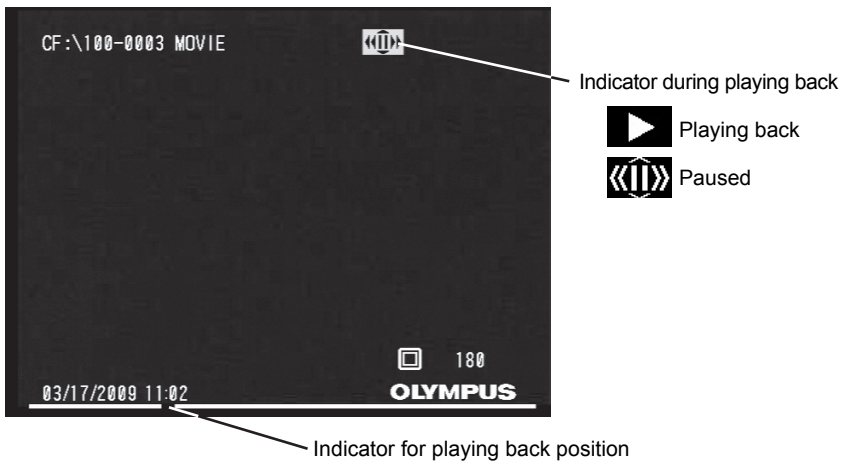
The name of the drive, a three digit folder number, and a 4 digit file name serial number are displayed at the upper left of the retrieve screen.

■ Stopping playback of still images with audio

- When the [VIEW] button is pressed while playing audio, the playing stops and the thumbnail screen reappears.
- When the [LIVE/GAIN] button is pressed while playing audio, the playing stops and the live screen appears.

■ Playing back and pausing of moving images

When moving images are played back, the playback indicator is displayed in the top of the screen. An indicator showing the position in the moving image is shown at the bottom of the screen. This indicator indicates the approximate position of the moving image being played back.

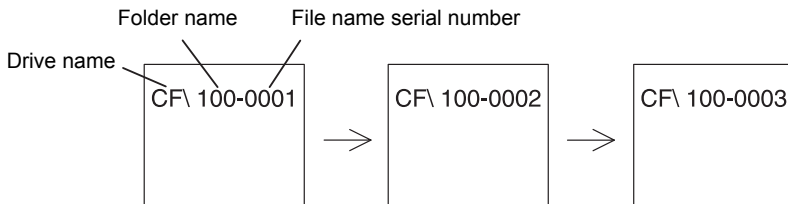


- When the [VIEW] button is pressed while playing moving images, the playing stops and the thumbnail screen reappears.
- Pressing the [MEAS/ENTER] joystick while a moving image is playing back pauses the moving image and displays the pause indicator. Tilting the [MEAS/ENTER] joystick to the left (right) while paused, displays a still image from one minute in the past (future), tilting the [MEAS/ENTER] joystick up (down) displays a still image one second in the past (future). The indicator showing the position in the moving image also moves. If the position indicator is at the end (beginning) of the moving image, tilting the [MEAS/ENTER] joystick right or down (left or up) moves it to the beginning (end).

- Pressing the [MEAS/ENTER] joystick while paused, starts the moving image from the point where the position indicator is.
- Pressing the [FRZ/REC] button while paused, records the paused image as a still image.
- When the [LIVE/GAIN] button is pressed while playing moving images, the playing stops and the live screen appears.

■ Slide retrieval

- During the retrieval of a still image, still image with audio, or moving image, the retrieved image can be switched with the [MEAS/ENTER] joystick.
- Tilt the [MEAS/ENTER] joystick to the right to switch images in increasing order of their file numbers. After reaching the file with the largest number in the folder by this way, the selection returns to the file with the smallest number.
- Tilt the [MEAS/ENTER] joystick to the left to switch images in decreasing order of their file numbers. After reaching the file with the smallest number in the folder in this way, the selection returns to the file with the largest number.



Example
CF\ 100-0001
C:\ 100-0001
D:\ 100-0001

Chapter 5 Menu operations and functions

The [MENU/EXIT] button on the control unit makes it possible to display a menu and perform settings and control of various functions.

5.1 Operating menu

■ Menu operations

- 1** Press the [MENU/EXIT] button to display the main menu.
- 2** Tilt the [MEAS/ENTER] joystick up, down, left or right to select the menu to open.
- 3** Press the [MEAS/ENTER] joystick to execute the selected menu function.
- 4** Press the [LIVE/GAIN] button to turn off the menu and return to the observation screen.

Press the [MENU/EXIT] button while the main menu is displayed to return to the observation screen.

Press the [MENU/EXIT] button while the submenu is displayed to return to the main menu.

The following description on the setting takes the “AUDIO VOL” menu as an example.

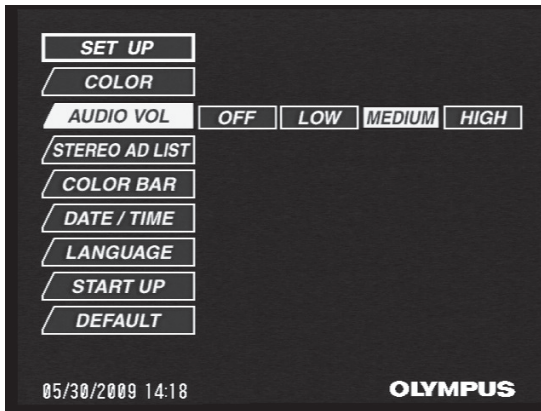
- 1** Press the [MENU/EXIT] button to display the main menu.



- 2** Tilt the [MEAS/ENTER] joystick up or down to select “SET UP”, then push the [MEAS/ENTER] joystick.



Now the SET UP menu appears. Tilt the [MEAS/ENTER] joystick to select “AUDIO VOL”.




- 3** Tilt the [MEAS/ENTER] joystick left or right to select “OFF”, “LOW”, “MEDIUM” or “HIGH”.


Now the operation is complete. If you press the [MENU/EXIT] button, you can return to the main menu and perform other menu settings. To terminate the menu setting operation, press the [MENU/EXIT] button again. If the [LIVE/GAIN] button is pressed instead, the menu will disappear and the observation screen will appear.


5.2 Using the live screen/frozen screen



■ Live screen/frozen screen menu display and functions

The menu on the live screen/frozen screen can be used for the following settings.

Main menu	Submenu	Description of function	Initial status
TITLE	—	Title input operation. See “Inputting the title” (page 99) for details about operations.	—
IMAGE	ENHANCE	Adjusts the clarity of the image. The enhancement levels in increasing order are “LOW”, “MEDIUM” and “HIGH”.	MEDIUM
	COLOR ENHANCE	Emphasizes or de-emphasizes the colors in the observation image. STD : Displays a standard type observed image. RED : Emphasizes the red in the display. BLU : Emphasizes the blue in the display. R&B : Emphasizes the overall colors in the display. B&W: Image is displayed in monochrome.	STD
	EXPOSURE	Adjust the CCD exposure time. The default is “AUTO”, which optimizes the exposure time automatically. The maximum exposure time can be set in the following range. NTSC: [17ms] → [500ms] PAL : [20ms] → [500ms] When stereo adapter is selected, this setting is fixed as 17 ms (NTSC) or 20 ms (PAL).	AUTO 17ms (NTSC) 20ms (PAL)
	NOISE REDUCTION	Switches the noise reduction setting from high to standard. Select “HIGH” when image noise is noticeable.  NOTE • When the stereo adapter is attached, it is automatically turned “OFF” and cannot be selected from the menu. • “HIGH” can cause ghosting when observing moving images.	STANDARD
	DEFAULT	Resets image menu settings to the default settings.	—

Main menu	Submenu	Description of function	Initial status
D/T/LOGO	—	<p>Sets the display at the bottom line on the screen. Displays date, time and title.</p> <p>ALL : Displays date, time, title, note, OLYMPUS logo, optical adapter name, zoom level, and brightness level.</p> <p>D/T/LOGO: Displays date, time, title, and OLYMPUS logo.</p> <p>D/T : Displays date, time and title.</p> <p>OFF : Nothing is displayed.</p> <p> NOTE</p> <ul style="list-style-type: none"> The note is displayed only when the content of note has been recorded together with a still image, see “Checking note edit results” (page 109). 	D/T/LOGO
RECORD	PRINT SCREEN	Sets whether the graphic display such as date/time, title, logo display and measurement results on the image are recorded together with the still image and the moving image.	OFF
	STILL QUAL	<p>Sets the still image quality level.</p> <p>STD : Standard quality JPEG</p> <p>HIGH : High quality JPEG</p> <p>SHQ : Super high quality JPEG</p> <p>TIFF : Uncompressed TIFF</p>	SHQ
	MOVIE QUAL	<p>Sets the movie recording size.</p> <p>STD:QVGA: Images are recorded at 320 x 240 pixels. Improves real-time recording.</p> <p>HIGH:VGA: Images are recorded at 640 x 480 pixels. Frame rate falls.</p>	STD:QVGA
	STILL AUDIO	Sets whether audio is recorded during still image recording.	OFF

Main menu	Submenu	Description of function	Initial status
RECORD	DESTINATION	<p>Selects the recording medium.</p> <p><When "USB" is set as "MEM/KYBD"> CF: Images are recorded to recording card. C:\: Images are recorded to internal memory. D:\: Images are recorded to USB memory connected to USB connector. MAIL ONLY: Images are sent to a computer connected to the network.</p> <p><When "USB" is set as "PC"> CF: Images are recorded to recording card. C:\: Images are recorded to internal memory. PC: Images are recorded to computer. Contact Olympus for details on setting "PC" or "MAIL ONLY".</p>	CF
	REC FUNCTION	<p>Sets the operations for the [FRZ/REC] button. Pressing and holding the [FRZ/REC] button does the following operations.</p> <p><When "STILL/MOVIE" is selected> Live screen : Records still and moving images. Frozen screen : Records still image only. Retrieve screen: Records still image only.</p> <p><When "STILL ONLY" is selected> Live screen : Records still image only. Frozen screen : Records still image only. Retrieve screen: Records still image only.</p>	STILL/ MOVIE
	NOTE 	Edits the notes recorded with the images.	—
	DEFAULT	Resets the RECORD menu settings to their default settings.	—
ADAPTER	—	<p>Sets the optical adapter settings.</p> <p>See "Changing the selection of the optical adapter" (page 110) for details about operations.</p>	—
W BALANCE	—	<p>White balance is automatically adjusted. After changing the optical adapter, capture an image of a white object, such as a piece of paper.</p> <p>Select "EXECUTE" to have white balance adjusted automatically.</p>	—

Main menu	Submenu	Description of function	Initial status
CONNECTION	USB CONNECTION	Switches USB function between host and device. MEM/KYBD : USB memory and keyboards can be used. PC : Use while connected to a computer. Restart the base unit after this setting. Contact Olympus for details about using the [PC] setting.	MEM/ KYBD
SET UP	COLOR	Sets the color of the display other than the menu display Select "ABC (with shadow)", and four colors; "WHITE", "GREEN", "MAGENTA" or "BLACK".	ABC (with shadow)
	AUDIO VOL	Sets the volume of the audio and beeps output level by the built-in speaker from "OFF", "LOW", "MEDIUM" or "HIGH". Audio and beeps are not output when it is set to "OFF".  NOTE • Alarm volume is permanently set to "HIGH".	MEDIUM
	STEREO AD LIST	Displays a list of the adapter names and number for the stereo optical adapters registered with the base unit. You can also delete unnecessary stereo optical adapters from here. Up to eight stereo optical adapters can be registered. Delete unnecessary stereo optical adapters to register new ones.	—
	COLOR BAR	Displays or hides the color bar. OFF: The color bar is not displayed. ON : The color bar is displayed.  NOTE • The [FRZ/REC] button is disabled when the color bar is displayed.	OFF
	DATE/TIME	Set the date and time. See "Setting the date and time" (page 112) for details about operations.	—

Main menu	Submenu	Description of function	Initial status
SET UP	LANGUAGE	Switches the menu display language. Select from English, French, Spanish, Japanese, Korean or Chinese for NTSC. Select from English, French, German, Italian, Spanish, Russian or Chinese for PAL. Restart the base unit after this setting. See "Language selection" (page 113) for details about operations.	ENGLISH
	START UP	Sets whether the default settings or the current settings are recalled the next time the system is started up. PREVIOUS: Saves the current settings and uses them to start up the system. DEFAULT : Starts up the system with the default settings.	DEFAULT
	DEFAULT	Resets the SET UP menu settings to the default settings.	—
DEFAULT	—	Resets all settings to the default settings.	—

■ Inputting the title

A title can be displayed in the live screen/frozen screen. The displayed title can be recorded together with the image. The recorded title of the image can also be modified.



NOTE

- You can input up to 30 characters for titles.
- You can register words and then access and input them (favorites function).
- You can input the alphabet, Western European letters (with umlauts and other diacritic marks), numbers, and symbols.
- You can input text from a USB keyboard.

Displaying the title input window

1 Press the [TITLE] button on the right side of the LCD monitor.

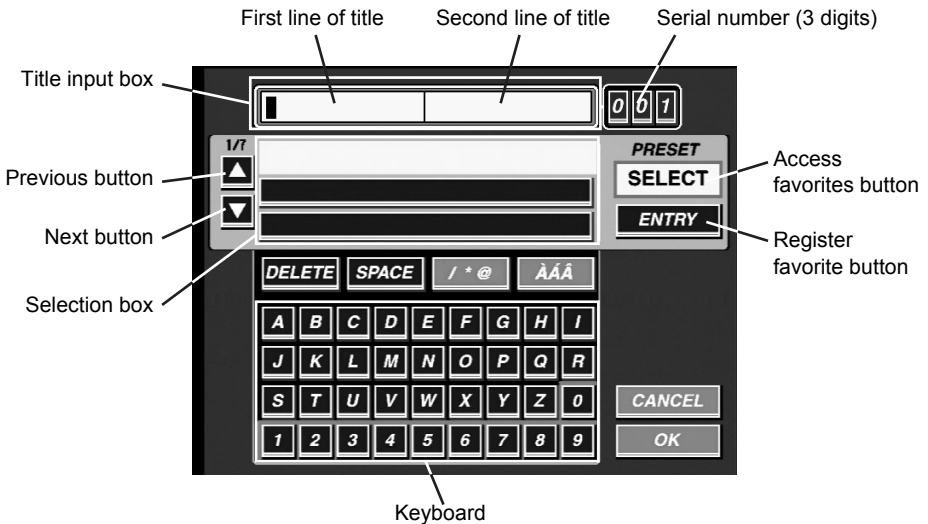
The title input window is displayed.

The currently set title is displayed in the first line of the selection box. The text registered in favorites is displayed in the second and following lines.



NOTE

- You can open the title input window by selecting "TITLE" from the main menu and pressing the [MEAS/ENTER] joystick.



Title input operations

There are three ways to input titles, as follows.

- Input text from the on-screen keyboard
- Access favorites to input
- Input from a USB keyboard

Input text from the on-screen keyboard

1 Select an input mode. Select the input mode button and press the [MEAS/ENTER] joystick.

- [ABC]/[/ * @]: The alphabet/symbol mode changes each time the [MEAS/ENTER] button is pressed.
- [ABC]/[ÀÁÃ]: The alphabet/European text mode changes each time the [MEAS/ENTER] button is pressed.

2 Select the text button assigned to the letter you want to input.

3 Press the [MEAS/ENTER] joystick to input the text you want.

If you input the first letter of a word, possible word choices appear in the selection box.

4 Select the word you want for the title from the selection box and press the [MEAS/ENTER] joystick. To switch to a different page in the selection box, select the previous/next selection button and press the [MEAS/ENTER] joystick.

The word selected in the selection box appears in the title input box.

5 Edit the work if necessary.

- To delete text, select the text to delete, select “DELETE” and press the [MEAS/ENTER] joystick.
- To insert text, select where to insert the text in the title box and then do steps 2 and 3.
- To input a space, select where to input a space, select “SPACE” and press the [MEAS/ENTER] joystick.

6 Repeat steps 2 through 5 to complete inputting a title.

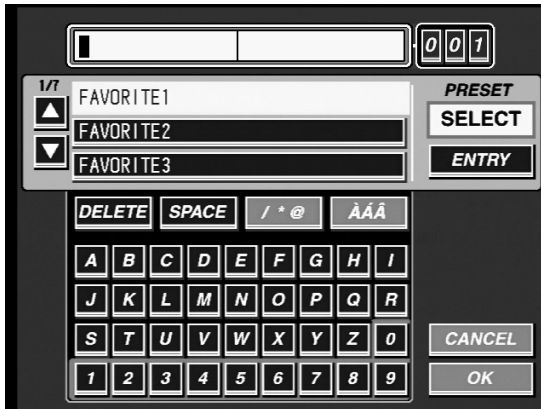
Access favorites to input

Select words that have been registered in favorites to input in the title.

See “Registering words to favorites” (page 103) for information about registering favorites.

1 Select “SELECT” and press the [MEAS/ENTER] joystick.

The favorites button is highlighted, and the word registered in favorites is displayed in the selection box.



To cancel accessing favorites, select the highlighted “SELECT” button and press the [MEAS/ENTER] joystick.

2 Select the word you want for the title from the selection box and press the [MEAS/ENTER] joystick. To switch to a different page in the selection box, select the previous/next selection button and press the [MEAS/ENTER] joystick.

The word selected in the selection box appears in the title input box.

3 Repeat steps 1 and 2 to complete inputting a title.

Input from a USB keyboard

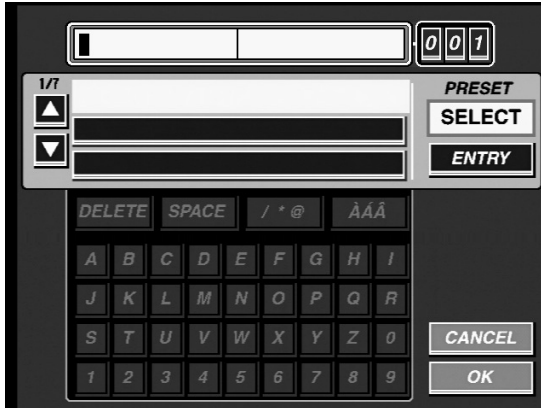
Titles can be input from a USB keyboard recommended by Olympus connected to the USB connector.



CAUTION

- Text input may not be possible from some USB keyboards. Contact OLYMPUS for details about USB keyboards.

- 1 Make sure that the USB connection is set to “MEM/KYBD”.**
For more information, see “USB settings” (page 111).
- 2 Connect the USB keyboard to the USB port to display the title input window.**
The keyboard in the title window turns grey.



- 3 Use the USB keyboard to input text.**
The text you input is displayed in the selection box.



NOTE

- When the USB keyboard is attached, the dictionary function is disabled so text input to the selection box appears as it is input.

- 4 Use the arrow keys to select words displayed in the first line of the selection box and then press the [Enter] key.**
The word selected in the selection box appears in the title input box.
- 5 Edit the work if necessary.**
 - To delete text, use the arrow keys to select the text to delete, and then press the [Delete] key.
 - To insert text, use the arrow keys to select where to insert the text in the title box and then do steps 2 and 3.
 - To input a space, use the arrow keys to select where to input a space, and then press the space key.
- 6 Repeat steps 3 through 5 to complete inputting a title.**

Serial number input operation

- 1** Tilt the [MEAS/ENTER] joystick up, down, left or right to select the desired position in the 3 digits serial number field.
- 2** With the serial number field selected, press the [MEAS/ENTER] joystick to enter each figure of the 3 digits serial number.
- 3** After inputting the serial number, select “OK” and press the [MEAS/ENTER] joystick.

The title input window closes and the input serial number is shown in the title display area.

By inputting serial numbers, the serial numbers are updated automatically every time an image is recorded (i.e. every time the [FRZ/REC] button is pressed for at least two seconds).



NOTE

- If all the digits in the serial number are blank, “_ _ _”, then a serial number is not displayed on screen. Also, in this situation, serial numbers are not updated when images are recorded.

Setting the completed title

- 1** After inputting the title, select “OK” and press the [MEAS/ENTER] joystick.

The title input window closes and the input title is shown in the title display area.

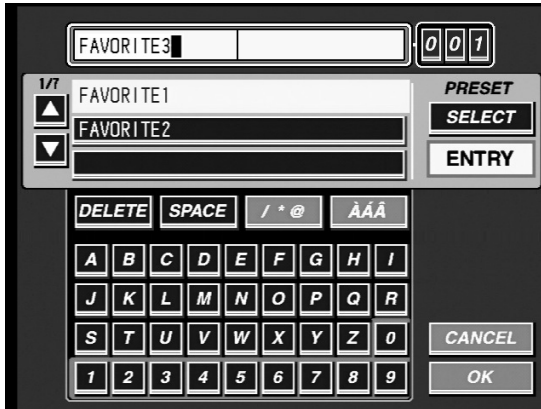
If nothing is input in the second line of the title, the characters input for the first line of the title are displayed in the bottom line on the screen.

Registering words to favorites

If you register commonly used words to favorites, you can access these words when you are inputting titles. You can register a maximum of 21 words to favorites.

- 1** Input the word you want to register to favorites in the title input box.
For more information on how to input text, see “Title input operations” (page 100).
- 2** Select “ENTRY” and press the [MEAS/ENTER] joystick.

The favorites registration button is highlighted, and the word being registered in favorites is displayed in the selection box.



To cancel favorites registration, select the highlighted “ENTRY” button and press the [MEAS/ENTER] joystick.

3 Select the page of the selection box for the word you want to register to favorites. To switch to a different page in the selection box, select the previous/next selection button and press the [MEAS/ENTER] joystick.

4 Select the line to register the word to and press the [MEAS/ENTER] joystick.

The word input to the title input box is registered to favorites.
Repeat steps 1 through 4 to register up to 21 words.

 **CAUTION**

- The registered word overwrites the specified line. Be careful to not mistakenly delete necessary words.
-

5 When you are finished registering words, select the highlighted “ENTRY” button and press the [MEAS/ENTER] joystick.

The favorites registration button returns to normal.

 **NOTE**

- You can delete words registered to favorites by not inputting any word to the title input box and then doing step 4.
-

■ Inputting the note

You can record still images with category and contents data displayed in the list as notes.

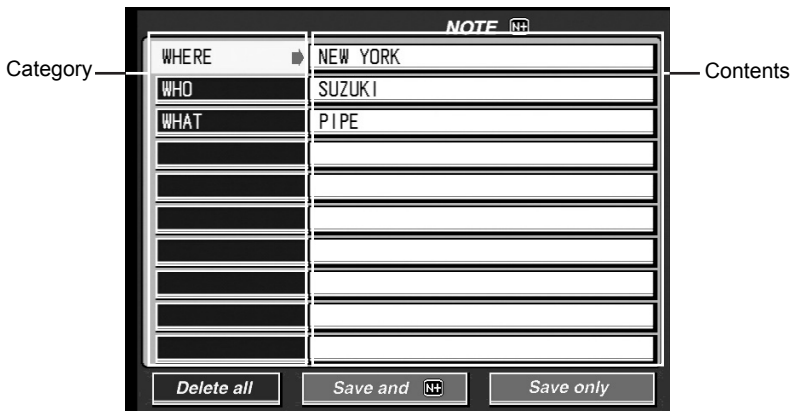


NOTE

- You can enter a maximum of 10 contents for each category for a total of 10 categories maximum.
- You can input 12 characters for categories and 28 characters for contents.
- The contents of notes recorded together with images can be checked by retrieving the image and selecting "ALL" in the "D/T/LOGO" menu.

Displaying the note edit window

- 1 Insert a recording card (CF card) specified by OLYMPUS into the RECORDING CARD slot on the base unit.**
- 2 Press the [NOTE] button on the right side of the LCD monitor.**
The note edit window appears.
The category and the content selected in the category are displayed according to the ADD_DATA.TXT file recorded to the recording card.



NOTE

- You can open the note edit window by selecting "RECORD" - "NOTE N+" from the main menu and pressing the [MEAS/ENTER] joystick.
- If a recording card is not inserted or if the ADD_DATA.TXT file does not exist on the recording card, the list is blank.
- See "Editing the ADD DATA.TXT file using a computer" (page 109) for information about creating ADD_DATA.TXT files.
- When "Delete all" is selected and the [MEAS/ENTER] joystick is pressed, the delete window appears. To delete all of the input categories and their contents, select "OK" in the delete window and press the [MEAS/ENTER] joystick.

Selecting the note

Select contents of a still image recorded with a category.

- 1** Select the category displayed to the left of the contents you want to change.
- 2** Tilt the [MEAS/ENTER] joystick to the right.
The contents that belong to that category are displayed in a list.
- 3** Select content and press the [MEAS/ENTER] joystick.
The window for editing and checking contents appears.
- 4** Select "SELECT" and press the [MEAS/ENTER] joystick.
- 5** Repeat steps 1 through 4, and select the content to record for the category.

Editing the note

Edit the content of the ADD_DATA.TXT file recorded on the recording card.



CAUTION

- Edited note data that is updated when the note edit window is closed. Edited data is lost if the power is turned off while the note edit window or the note input window is opened.
 - If note editing is cancelled, the edited details will be lost. Cancel note editing by pressing the [MENU/EXIT] button, [LIVE/GAIN] button, or [NOTE] button when the note edit window is displayed.
-

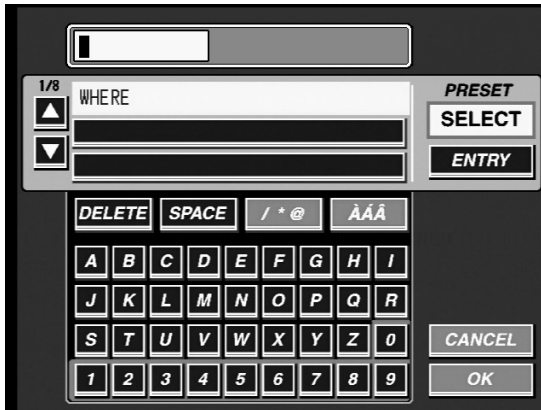
Editing categories

- 1** In the note edit window, select the category you want to edit and press the [MEAS/ENTER] joystick.

The window for editing and checking categories appears.

- 2** Select “EDIT” and press the [MEAS/ENTER] joystick.

The note input window appears.



NOTE

- You can add a category in the note edit window by selecting the blank category line and pressing the [MEAS/ENTER] joystick.

- 3** Edit category.

Editing is done the same way as inputting titles. For more information on operations, see “Title input operations” (page 100).

- 4** After editing the category, select “OK” and press the [MEAS/ENTER] joystick.

The note input window disappears, and the edits are reflected in the category in the note edit window.

Editing contents

- 1** In the note edit window, select the category displayed to the left of the contents you want to edit.
- 2** Tilt the [MEAS/ENTER] joystick to the right.
- 3** Select the content you want to edit and press the [MEAS/ENTER] joystick.

The window for editing and checking contents appears.



NOTE

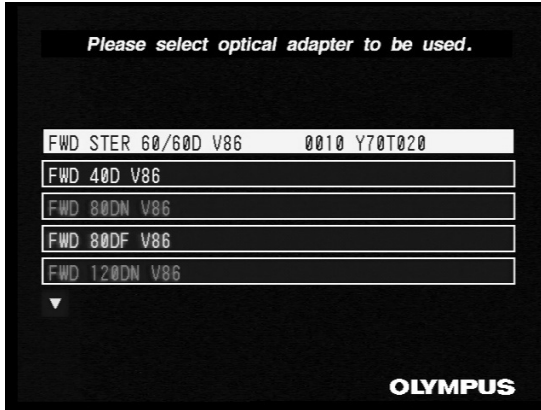
- You can add contents in the note edit window, by selecting the blank content line and pressing the [MEAS/ENTER] joystick.
-

- 4** Select “EDIT” and press the [MEAS/ENTER] joystick.
The note input window appears.
- 5** Edit content.
Editing is done the same way as inputting titles. For more information on operations, see “Title input operations” (page 100).
- 6** After editing the content, select “OK” and press the [MEAS/ENTER] joystick.
The note input window disappears, and the edits are reflected in the contents in the note edit window.

■ Changing the selection of the optical adapter

You can change the stereo optical adapter settings if the set number is incorrect.

- 1** Press the [MENU/EXIT] button to display the main menu.
- 2** Select “ADAPTER” and press the [MEAS/ENTER] joystick.
The optical adapter list is displayed.



This list shows registered stereo adapter scope unit combinations as well as all other optical adapters other than stereo optical adapters.

- 3** Select the correct set number from the optical adapter list for the stereo optical adapter that is currently attached and then press the [MEAS/ENTER] joystick.

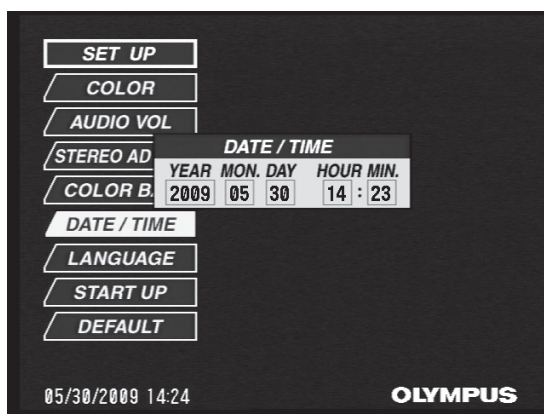
■ USB settings

You can connect USB memory or USB keyboard, which has been recommended by Olympus, or a computer to the base unit by switching the USB settings. Contact Olympus for details about connecting to a computer.

- 1** Press the [MENU/EXIT] button to display the main menu.
- 2** Select the “CONNECTION” and push the [MEAS/ENTER] joystick.
- 3** Select “USB CONNECTION”.
- 4** Tilt the [MEAS/ENTER] joystick to the left or right to set the USB function.
Select “MEM/KYBD” to use a USB memory or USB keyboard.
Select “PC” to connect to a computer.
- 5** To enable the settings, press the [POWER] button to turn off the power, then press the [POWER] button again to turn the power on.

■ Setting the date and time

- 1** Press the [MENU/EXIT] button to display the main menu.
- 2** Select the “SET UP” menu and press the [MEAS/ENTER] joystick.
- 3** Select “DATE/TIME” and press the [MEAS/ENTER] joystick.
The “DATE/TIME” menu is displayed.



- 4** Tilt the [MEAS/ENTER] joystick to the left or right to select the item to adjust (“YEAR”, “MON.”, “DAY”, “HOUR” or “MIN.”).
- 5** Tilt the [MEAS/ENTER] joystick up or down to select a number, then press the [MEAS/ENTER] joystick.

■ Language selection

Sets the menu display language.

You can select from Japanese, English, Spanish, Chinese, Korean, French, German, Italian or Russian.



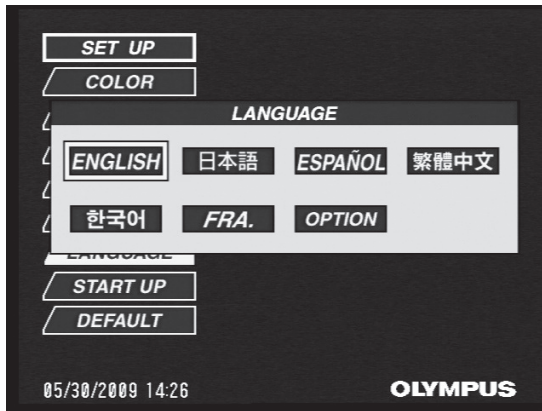
NOTE

- Restart takes about a few minutes after the menu display language selection is changed.

- 1** Press the [MENU/EXIT] button to display the main menu.
- 2** Select the “SET UP” menu and press the [MEAS/ENTER] joystick.
- 3** Select “LANGUAGE” and press the [MEAS/ENTER] joystick.

The language selection window is displayed.

Select from English, French, Spanish, Japanese, Korean or Chinese for NTSC.
Select from English, French, German, Italian, Spanish, Russian or Chinese for PAL.




- 4** Tilt the [MEAS/ENTER] joystick up, down, left or right to select a language and push the [MEAS/ENTER] joystick.
- 5** Now press the [POWER] button to turn off the power. Then press the [POWER] button again to turn the power on; the menu will be displayed in the selected language.

5.3 Using the thumbnail screen/retrieve screen

■ Thumbnail screen menu display and functions

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



Main menu	Submenu	Description of function	Initial status
TITLE	—	Title input operation. See “Inputting the title” (page 99) for details about operations.	—
DELETE	—	Images recorded on a recording media can be deleted. See “Delete image” (page 119) for details about operations.	—
COPY	—	Copy images recorded on recording media to a different folder or drive. See “Move images/copy images” (page 121) for details about operations.	—
MOVE	—	Move images recorded on a recording media to a different folder or drive. See “Move images/copy images” (page 121) for details about operations.	—
SEARCH	—	Images recorded on recording media can be searched for by date. See “Searching images” (page 122) for details about operations.	—
FOLDER	ADD	New folders can be created in the recording media. See “Adding folders” (page 124) for details about operations.	—
	RENAME	Change the name of the selected folder. See “Changing the name of folders” (page 125) for details about operations.	—

Main menu	Submenu	Description of function	Initial status
SET UP	COLOR	Sets the color of the display other than the menu display Select "ABC (with shadow)", and four colors; "WHITE", "GREEN", "MAGENTA" or "BLACK".	ABC (with shadow)
	AUDIO VOL	Sets the volume of the audio and beeps output level by the built-in speaker from "OFF", "LOW", "MEDIUM" or "HIGH". Audio and beeps are not output when it is set to "OFF".  NOTE _____ <ul style="list-style-type: none"> Alarm volume is permanently set to "HIGH". 	MEDIUM
	DEFAULT	Resets the SET UP menu settings to the default settings.	—
FORMAT	—	Formats the recording card or USB memory. See "Format recording card/internal memory/USB memory" (page 127) for details about operations.	—
DEFAULT	—	Resets all settings to the default settings.	—

■ Retrieve screen menu display and functions

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

Main menu	Submenu	Description of function	Initial status
COMPARE	—	The live and retrieve images can be displayed simultaneously and compared. See “Compare two images (COMPARE)” (page 118) for details about operations.	—
TITLE	—	Title input operation. See “Inputting the title” (page 99) for details about operations.	—
DELETE	—	Images recorded on a recording media can be deleted. See “Delete image” (page 119) for details about operations.	—
D/T/LOGO	—	Sets the display at the bottom line on the screen. Displays date, time and title. ALL : Displays date, time, title, note, OLYMPUS logo, optical adapter name, zoom level, and brightness level. D/T/LOGO: Displays date, time, title, and OLYMPUS logo. D/T : Displays date, time and title. OFF : Nothing is displayed.	D/T/LOGO

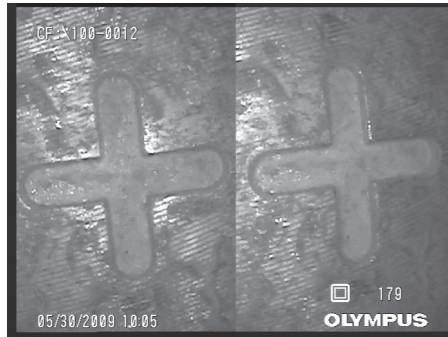
Main menu	Submenu	Description of function	Initial status
RECORD	PRINT SCREEN	Sets whether the graphic display such as date/time, title, note, logo display and measurement results on the image are recorded together with the still image.	OFF
	DESTINATION	Selects the recording medium. <When "USB" is set as "MEM/KYBD"> CF: Images are recorded to recording card. C:\: Images are recorded to internal memory. D:\: Images are recorded to USB memory connected to USB connector. MAIL ONLY: Images are sent to a computer connected to the network. <When "USB" is set as "PC"> CF: Images are recorded to recording card. C:\: Images are recorded to internal memory. PC: Images are recorded to computer. Contact Olympus for details on setting "PC" or "MAIL ONLY".	CF
	NOTE 	Edits the notes recorded with the images.	—
	DEFAULT	Resets the RECORD menu settings to the default settings.	—
SET UP	COLOR	Sets the color of the display other than the menu display. Select from "ABC (with shadow)" and four colors; "WHITE", "GREEN", "MAGENTA" or "BLACK".	ABC (with shadow)
	AUDIO VOL	Sets the volume of the audio and beeps output level by the built-in speaker from "OFF", "LOW", "MEDIUM" or "HIGH". Audio and beeps are not output when it is set to "OFF".  NOTE • Alarms volume is permanently set to "HIGH".	MEDIUM
	DEFAULT	Resets the SET UP menu settings to the default settings.	—
DEFAULT	—	Resets all settings to the default settings.	—

■ Compare two images (COMPARE)

The live and retrieve images can be displayed simultaneously and compared.

- 1 Use quick replay or select the images you want to compare from the thumbnail screen and retrieve (play) them.**
- 2 Press the [MENU/EXIT] button to display the main menu.**
- 3 Select “COMPARE” and press the [MEAS/ENTER] joystick.**

The retrieved image is displayed on the left half and the live image is displayed on the right half of the screen.



The following functions are available on the compare screen.

- Tilting the [MEAS/ENTER] joystick to the left or right scrolls the retrieved image to the left or right.
- Tilt the [ANGLE] joystick to do angulation in the live screen.
- Press the [FRZ/REC] button for at least two seconds to record the image being compared.
- Pressing the [BRT] lever while the live image is displayed on the right half of the screen allows the automatic brightness control to be applied to the live image.
- Pressing the [BRT] lever while a frozen image is displayed on the right half of the screen allows the contrast correction to be applied to the retrieved image in the left half of the screen.

- 4 To exit from the COMPARE function, press the [VIEW], [MENU/EXIT] or [LIVE/GAIN] button.**

Holding down the [VIEW] button for about two seconds or pressing the [MEAS/EXIT] button displays the thumbnail screen.

Pressing the [LIVE/GAIN] button displays the Live screen.

■ Modify/clear title

- In the thumbnail screen, the title of the image selected with the thumbnail selection frame is shown in the title display area. When the title input window is opened and the title or serial number is entered now, the title or serial number of the selected thumbnail image will be updated.
- In the retrieve screen, the title of the retrieved image is shown in the title display area. When the title input window is opened and the title or serial number is entered now, the title or serial number of the image being retrieved will be updated.

■ Delete image

Images can be deleted from a recording card (CF card), internal memory, or USB memory.



CAUTION

- If the recording card is removed during the image deletion process, the data in the card may be destroyed. Never attempt to remove the recording card while deleting images.

Deleting images in the thumbnail screen

1 In the thumbnail screen, tilt the [MEAS/ENTER] joystick to select the image to be deleted by moving the thumbnail selection frame.

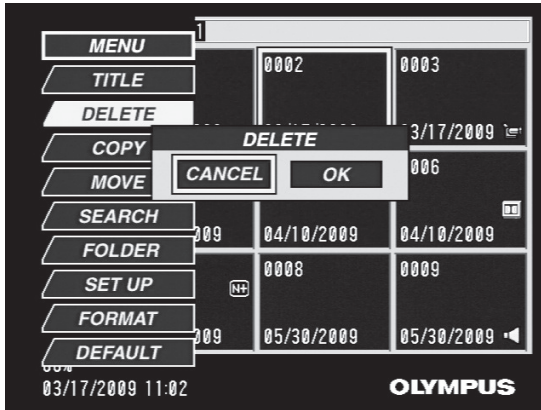
To delete multiple images, mark the images you want to delete in the following procedure.

- (1) Select the images to delete with the [MEAS/ENTER] joystick.
- (2) Press the [BRT▲] button to mark the selected images. “✓” is displayed.
- (3) Repeat steps (1) and (2) to mark all the images to delete.
- (4) If you mark an image that you do not want to delete, press the [BRT▲] button again while the image is selected to remove the mark.

2 After selecting the image you want to delete, press the [MENU/EXIT] button to display the menu.

3 Select “DELETE” and push the [MEAS/ENTER] joystick.

The Delete window is displayed.



4 Select “OK” and press the [MEAS/ENTER] joystick to delete the selected image.

When multiple images are being deleted, the total number of images being deleted and the number of images already deleted is displayed.

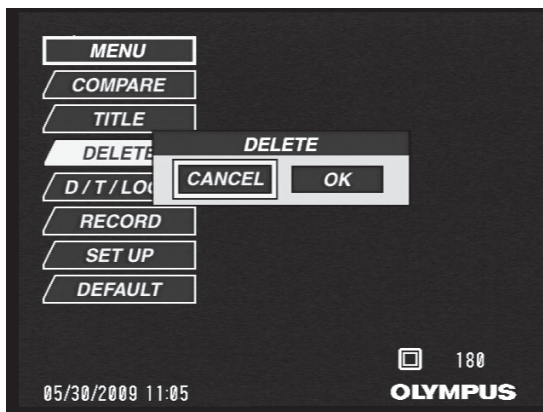
5 When the operation is finished the menu disappears and the thumbnail screen reappears.

Deleting images in the retrieve screen

1 Press the [MENU/EXIT] button while a still image is displayed to display the menu.

2 Select “DELETE” and push the [MEAS/ENTER] joystick.

The Delete window is displayed.



3 Select “OK” and press the [MEAS/ENTER] joystick to delete the retrieved image.

■ Move images/copy images

Images can be moved or copied from a recording card (CF card), internal memory, or USB memory.



CAUTION

- If the recording card or USB memory is removed during image movement or the copy process, the data in the card may be destroyed. Never attempt to remove the recording card or USB memory while moving or copying images.

Moving/copying images to another folder

1 In the thumbnail screen, tilt the [MEAS/ENTER] joystick to select the image to be copied/moved by moving the thumbnail selection frame.

To move/copy multiple images, mark the images you want to move/copy in the following procedure.

- (1) Select the images to move/copy with the [MEAS/ENTER] joystick.
- (2) Press the [BRT▲] button to mark the selected images. “✓” is displayed.
- (3) Repeat steps (1) and (2) to mark all the images to move/copy.
- (4) If you mark an image that you do not want to move/copy, press the [BRT▲] button again while the image is selected to remove the mark.

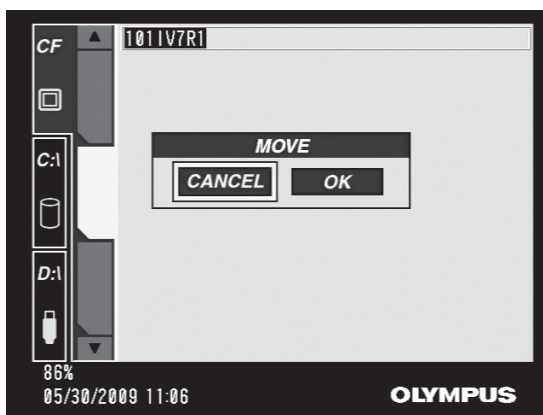
- 2 After selecting the image you want to move or copy, press the [MENU/EXIT] button to display the menu.
- 3 Select “MOVE” or “COPY” and press the [MEAS/ENTER] joystick. The Move or Copy window is displayed.



NOTE

- The drive can also be changed when selecting a folder.

- 4 Select the folder into which to move/copy the image and press the [MEAS/ENTER] joystick. A confirmation window is displayed.



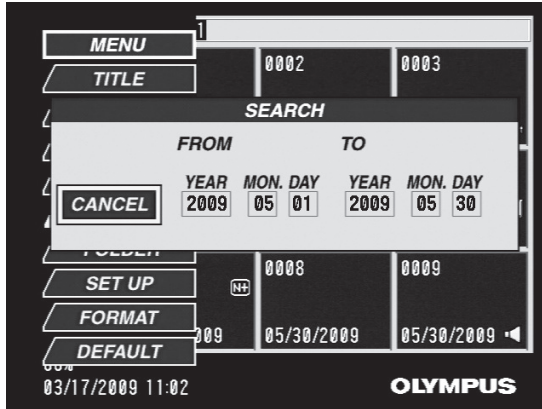
- 5 Select “OK” and press the [MEAS/ENTER] joystick to start moving or copying the image. When multiple images are being moved/copied, the total number of images being moved/copied and the number of images already moved/copied is displayed.
- 6 When image moving or copying completes, the thumbnail screen reappears.

■ Searching images

Images on a recording card (CF card), internal memory, or USB memory can be searched by date.

- 1 Display the thumbnail screen and then open the drive you want to search.

- 2** Press the [MENU/EXIT] button to display the menu.
- 3** Select “SEARCH” and push the [MEAS/ENTER] joystick.
The SEARCH window is displayed.



The SEARCH window includes the “CANCEL” button and a total of six search condition input fields, which are composed of “YEAR, MON., DAY” for the FROM condition and “YEAR, MON., DAY” for the TO condition.

- 4** With the SEARCH window displayed, tilt the [MEAS/ENTER] joystick to the left or right to select “CANCEL” or one of the six search condition input fields.
- 5** Select one of the search condition input fields and tilt the [MEAS/ENTER] joystick up or down to input each search condition.
- 6** After inputting some search condition, press the [MEAS/ENTER] joystick to display the thumbnail images matching the input search conditions.
 - The displayed thumbnail screen shows the set search conditions.
 - To cancel the search, select “CANCEL” and press the [MEAS/ENTER] joystick. The search will be cancelled and the thumbnail screen is displayed.
 - When the [MENU/EXIT] button is pressed while the SEARCH window is displayed, the search conditions will return to those before the SEARCH window was displayed.

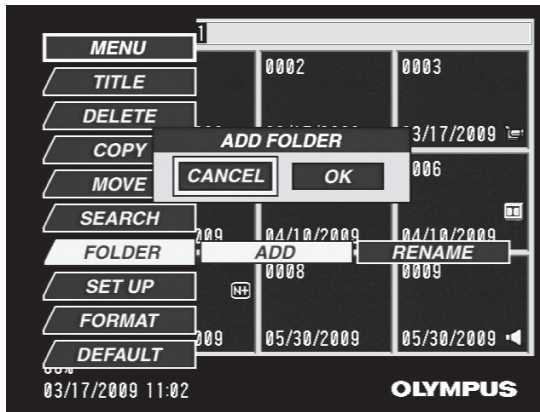
■ Add/rename/delete folder

Adding folders

New folders can be created on a recording card (CF card), internal memory, or USB memory.

- 1** Display the thumbnail screen and then open the drive in which you want to create a folder.
- 2** Press the [MENU/EXIT] button to display the menu.
- 3** Select “FOLDER”.
- 4** Tilt the [MEAS/ENTER] joystick left or right to select “ADD” and press the [MEAS/ENTER] joystick.

The Add folder window appears.



- 5** Select “OK” and press the [MEAS/ENTER] joystick.
A folder is created that has a folder number one digit higher than the existing folder.
- 6** The menu disappears and the thumbnail screen appears. After a folder is added, the thumbnail screen is displayed in which the added folder is selected.

Changing the name of folders

You can change the name of folders.

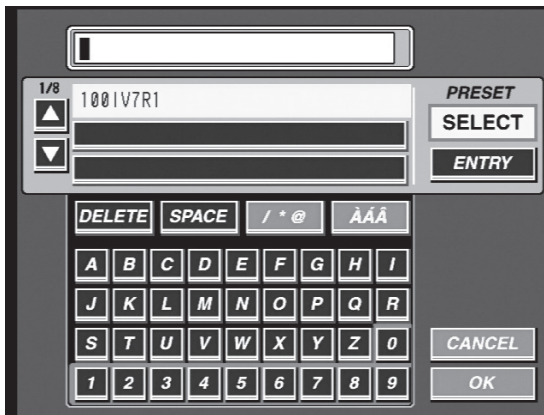


NOTE

- You can input up to 30 single-byte characters.
- You can input alphabet, Western European letters (with umlauts and other diacritic marks), numbers, and symbols (except for /:*?"\<>|).

- 1** Display the thumbnail screen and then select a folder.
- 2** Press the [MENU/EXIT] button to display the menu.
- 3** Select “FOLDER”.
- 4** Tilt the [MEAS/ENTER] joystick left or right to select “RENAME” and press the [MEAS/ENTER] joystick.

The folder name input window appears.



- 5** Edit folder name.
Editing is done the same way as inputting titles. For more information on operations, see “Title input operations” (page 100).
- 6** After editing the folder name, select “OK” and press the [MEAS/ENTER] joystick.

The folder name input window closes and the name of the folder in the thumbnail screen changes.

Deleting folders

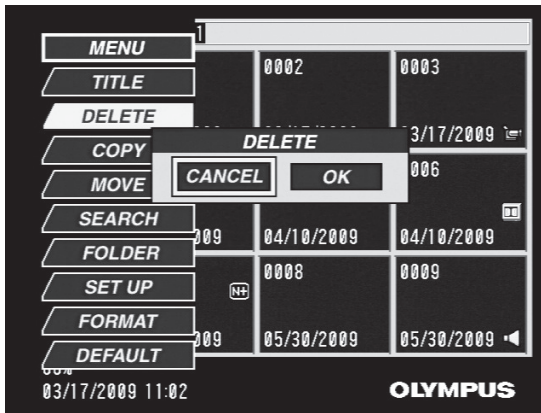
Deleting a folder also deletes the images in the deleted folder.



NOTE

- If a folder cannot be deleted, delete it from your computer.

- 1** In the thumbnail screen, tilt the [MEAS/ENTER] joystick to select the folder tab of the folder to be deleted by moving the thumbnail selection frame.
- 2** Press the [MENU/EXIT] button to display the menu.
- 3** Select “DELETE” and press the [MEAS/ENTER] joystick.
The Delete window is displayed.



- 4** Select “OK” and press the [MEAS/ENTER] joystick.
The images in the selected folder are deleted.

■ Format recording card/internal memory/USB memory

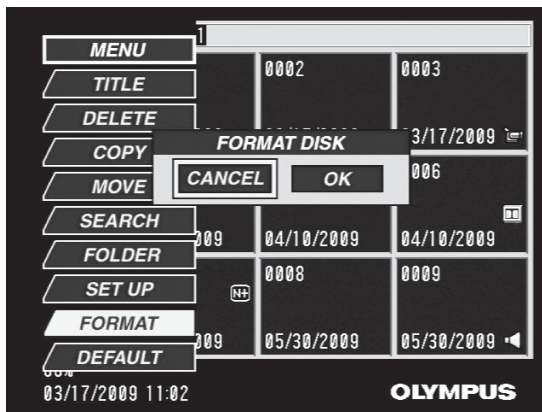
Format recording media such as recording cards (CF cards), internal memory or USB memory. Note that formatting a recording card deletes all images and folders previously recorded on the recording card, internal memory or USB memory.



CAUTION

- Never remove the recording card or USB memory during formatting.

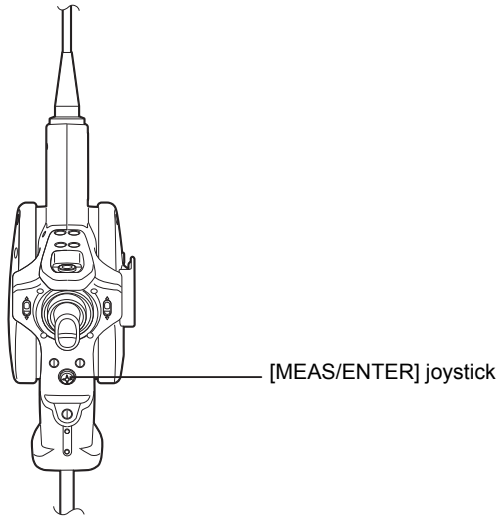
- 1** Display the thumbnail screen and then open the drive you want to format.
- 2** Press the [MENU/EXIT] button to display the menu.
- 3** Select “FORMAT” and push the [MEAS/ENTER] joystick.
The “FORMAT DISK” window is displayed.



- 4** Select “OK” and press the [MEAS/ENTER] joystick to start formatting.
 - Depending on the capacity and type of CF card, internal memory or USB memory used, the formatting operation can last for several seconds to minutes.
 - After formatting, a folder numbered 100 is created automatically in the recording card, internal memory or USB memory.
 - The display may not show “100%” remaining capacity for the media.

Chapter 6 Measurement procedures

The optical adapter must be set in advance to do measurements. With a live image or a recorded image displayed, press the [MEAS/ENTER] joystick on the control unit. This causes the measurement to be done according to the selected optical adapter. To move the cursor during measurement, tilt the [MEAS/ENTER] joystick in the desired direction.



 **NOTE**

- For details about error messages that may appear during measurement, see “Messages displayed during stereo measurement” (page 178).
-

6.1 Measuring from three dimensional (3D) coordinates (stereo measurement)

The 3D coordinates of each specified point are calculated by applying the principles of triangulation to a set of images obtained using two objective lenses that are set in parallax. Measurements are done based on these coordinates.

■ Measurement accuracy



CAUTION

- As this measurement method uses image processing technology, the measurement accuracy is affected by the quality of the image used. Image quality varies depending on the surface conditions of the object and image capturing conditions such as the brightness. Due to this, Olympus cannot guarantee the accuracy of the results obtained with this measurement method. We recommend that users identify the measurement accuracy through experiments. To obtain more correct results, it is recommended to perform measurements using more than one set of images captured from different viewpoints.

A pair of corresponding points (same location) in two images on the left and right must be identified to do stereo measurements. This operation is referred to as matching. The software is capable of automated matching. However, since it employs image processing, it may be unable to obtain the correct corresponding point if a similar shape exists in the proximity of the point indicated in the image. After completion of measurement, always be sure to check the positions of the pointers in the left and right images and confirm that they indicate the same point on the object as the corresponding points. The measured value loses reliability if the corresponding point is erroneous. In this case, use the correction function which will be described later or change the viewpoints (by moving the tip of the scope) and perform the measurement again. However, matching cannot be done for some images. For example, if the surface is reflective, such as a clean stainless steel pipe. With such an object, try changing the viewpoints (by moving the tip of the scope) to make the measurement. This may sometimes make correct measurement possible.

The object distance measurement calculates the distance between the distal end of the optical adapter and the subject in a live, frozen, retrieved or stereo measurement image. As the measurement is affected if the image of the object is blurred, move the distal end of the scope slowly. When the object distance measurement is applied to a live image, the displayed measurement value is measured from a few frames before the current image. Consequently, if stereo measurement is activated while performing object distance measurement, the object distance measurement value may differ from the stereo measurement result of the distance between the distal end of the scope and the indicated point.

■ Flow of stereo measurement

1 Preparation for stereo measurement

Prepare for measurement by the following procedure described in “Attaching the stereo optical adapter” (page 131) and “Stereo optical adapter selection” (page 132).



2 Measurement value check

Check the measurement value before inspection by the following procedure described in “Measurement value check” (page 140).



3 Execution of stereo measurement

Capture the object image and apply measurement.



4 Measurement value check

After completing inspection, check the measurement value after examination by the following procedure described in “Measurement value check” (page 140).



CAUTION

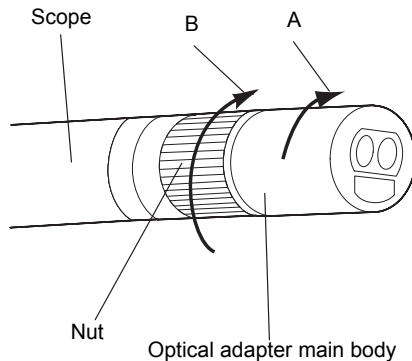
- If the inspection values vary considerably before and after the inspection, a possible cause may be a loosening of the optical adapter during inspection. As the measurement result is not reliable in this case, capture the object image again.
-

If the optical adapter is loose, make sure that the O-ring has not been detached. If the O-ring is detached, attach the spare O-ring correctly. See “Inspecting the O-ring” (page 40) for information on how to attach the O-ring.

■ Attaching the stereo optical adapter

See also “3.5 Inspecting the scope” (page 39) for more information on attaching stereo optical adapters.

- 1** Make sure that the O-ring in the scope distal end or in the optical adapter is properly attached.
- 2** Attach the adapter so that there is no movement of the adapter main body. Rotate the optical adapter in the direction of the arrow A shown in the figure. Keep the adapter rotated completely and turn the nut of the optical adapter in the direction of the arrow B shown in the figure until it is tight.

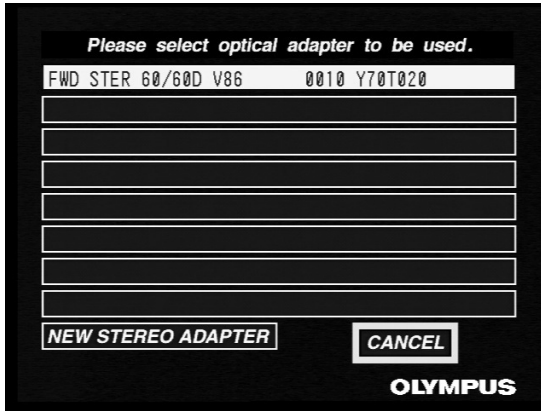


CAUTION

- Tools or excessive hand force should not be used to secure the tip adapter to the distal end.
- Whether or not the adapter rattles or is loose when it is attached, if it is not firmly attached by rotating in the direction of arrow A completely, the measurement accuracy deteriorates.
- After installation of the optical adapter, if the distal end of the scope is handled by grasping the optical adapter, it may turn in the opposite direction of arrow A in the figure even when the nut is tightened securely. This could result in lowered measurement accuracy. When handling the distal end of the scope, do not hold it by the optical adapter, always grasp the scope. However, do not hold it by the angulation section.
- When the distal end of the scope is subjected to a large extraneous force or vibration, the optical adapter installation may be jolted, loosened or turned. Even if you leave the optical adapter attached to the scope, always check the installation condition before inserting the scope into the subject.
- Dirt on the surface of the lens of the adapter affects the measurement accuracy. Check captured images to confirm that there is no dirt before using the adapter in an actual measurement.

■ Stereo optical adapter selection

- 1 The stereo optical adapter list shown below is displayed when the live screen is displayed if a stereo optical adapter is attached.



This list shows all the set numbers and adapter names of the stereo optical adapters registered that are the same type as the stereo optical adapter that is connected. The line selected in the list is the stereo optical adapter that was used the last time that measurements were made.

2 Select the optical adapter to be used from this list and press the [MEAS/ENTER] joystick.

- If a stereo optical adapter that is the same type as the stereo optical adapter that is connected has not been registered, you need to register the stereo optical adapter by executing “NEW STEREO ADAPTER”. See “Using a new stereo optical adapter (NEW STEREO ADAPTER)” (page 134) for details about operations.
- Select “CANCEL” and press the [MEAS/ENTER] joystick to end the stereo optical adapter settings and return to the live screen. The stereo optical adapter list is displayed until the stereo optical adapter is removed.

- 3** The following message is displayed when the stereo optical adapter is removed. Press the [MEAS/ENTER] joystick to delete the message.

**CAUTION**

- The operation above is not done when the optical adapter is attached except in the live screen. It is only executed when the live screen is displayed.

■ Using a new stereo optical adapter (NEW STEREO ADAPTER)

To use a new stereo optical adapter for stereo measurements, you need to register the stereo optical adapter in advance by executing “NEW STEREO ADAPTER” in the stereo optical adapter list.



CAUTION

- When the combination of the stereo optical adapter is changed due to additional purchase or repair of the original scope unit, it is required to execute the “NEW STEREO ADAPTER” setup.



NOTE

- The “NEW STEREO ADAPTER” setup consists of creating the environment data, which is the measurement parameters specific to the combination of a specific stereo optical adapter and specific scope, based on the optical data that is the information specific to each stereo optical adapter model (this data is provided with the Stereo Measurement Set) and on the white image that is the information on the combination of the stereo optical adapter and scope.
- The environment data that is created is stored in the internal memory of the base unit.

1 Attach the new stereo optical adapter to the distal end of the scope while the live screen is displayed.

The stereo optical adapter list is displayed.

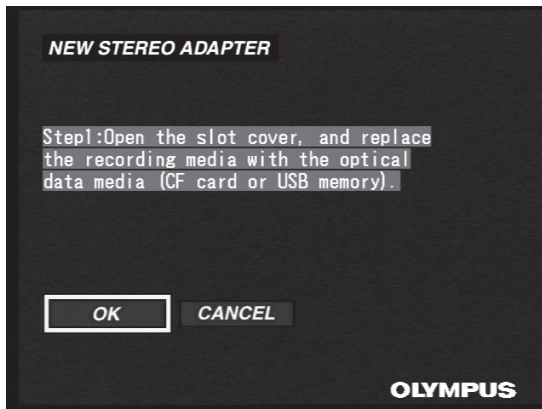


- 2** Select “NEW STEREO ADAPTER” in the stereo optical adapter list and then press the [MEAS/ENTER] joystick.



- 3** Insert an optical data media (CF card or USB memory) into the **RECORDING CARD** slot or the **USB connector**.

If a recording card is inserted, the message shown below is displayed. Remove the recording card and insert an optical data media.



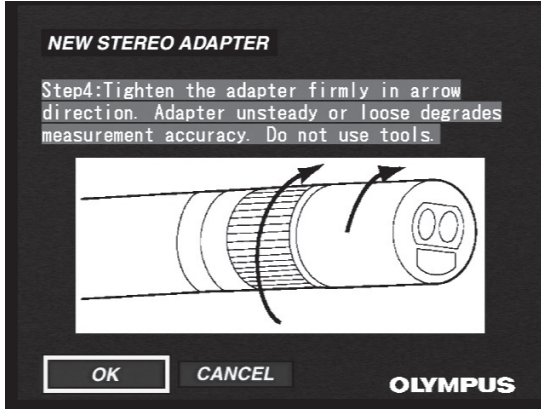
Select “OK” and then press the [MEAS/ENTER] joystick. The new stereo optical adapter’s name and set number are displayed.

- 4** Make sure that the adapter name and the set number for the new stereo optical adapter are correct and then select “OK” and press the [MEAS/ENTER] joystick.

5 Check that the stereo optical adapter is securely attached, select “OK”, and then press the [MEAS/ENTER] joystick.

The illumination of the distal end of the scope lights.

See “Attaching the stereo optical adapter” (page 131) for the attachment procedure.



! CAUTION

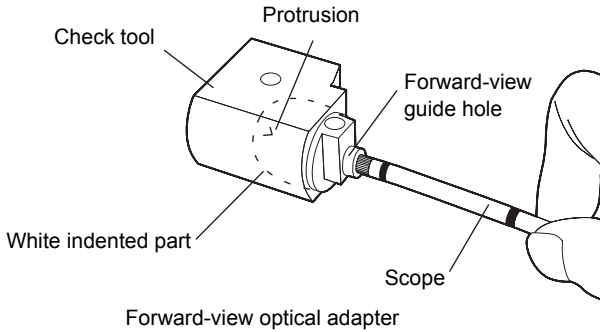
- If the stereo optical adapter is not installed properly, it will not be possible to get correct measurement results.
-

6 Adjust the brightness of a white image.

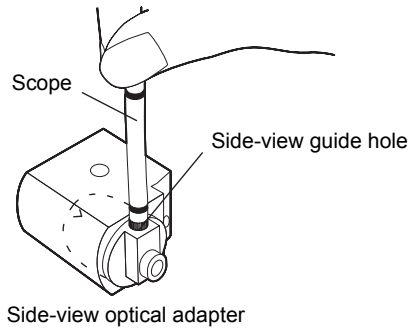
Use the check tool provided with the stereo measurement set to capture a white image.

The orientation of the scope in the white indented part is different depending on whether the optical adapter is a direct view type or side view type.

- For forward-view optical adapter
Insert the distal end of the scope into the forward-view guide directly oriented towards the protrusion in the white indented part.



- For side-view optical adapter
Insert the distal end of the scope into the side-view guide directly oriented towards the protrusion in the white indented part.



- ## 7
- After inserting the scope distal end into the guide hole to the end, rotate the check tool so that the protrusion in the middle of the white indented part comes into the center of the visual field.**

8 When the scope is set in the check tool, press the [FRZ/REC] button to freeze the white image.

When capturing the white image, hold the scope by a position behind the angulation section so that no force is applied to the optical adapter and angulation section.



CAUTION

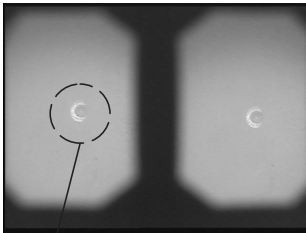
- Applying excessive force to the optical adapter when capturing a white image may reduce measurement accuracy.



NOTE

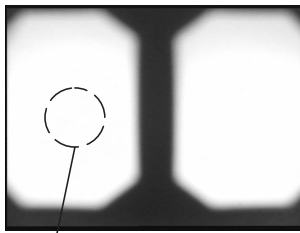
- Capturing a white image
The white image affects measurement accuracy so it is necessary to adjust the brightness to the appropriate level as shown below.

Insufficient illumination



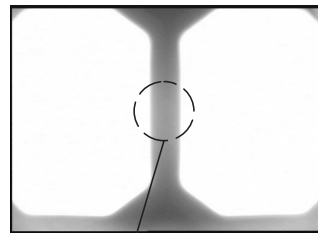
Protrusion

Optimum



Bright enough that the protrusion cannot be seen

Excessive illumination



Too bright

If dirt is on the white indented part of the check tool, it may not be able to capture an adequate white image. In this case, remove the guide, which is the part with the holes for the forward-view and side-view guides for optical adapter, from the white indented part and clean out the dirt.

The guide can be removed by turning it counterclockwise. Use a gauze cloth with soapy water to wipe off the dirt. To reattach the guide, repeat these steps in reverse order.

9 The environment data for the new stereo optical adapter is stored in the base unit's internal memory when the white image has been captured successfully. Then the "NEW STEREO ADAPTER" is completed.

The following message is displayed. Remove the optical data media (CF card or USB memory) from the RECORDING CARD slot or the USB connector and then select "OK" and press the [MEAS/ENTER] joystick.



10 Keep the optical data media in the optical adapter case so it does not get lost.



NOTE

- After a new stereo setup is completed, a file with the name "IV7CALIB\FREEZE.JPG" is created on the optical data media. Removing this file does not affect operation.

Messages displayed during NEW STEREO ADAPTER

Message	Description
STEP1	Open the slot cover, and replace the recording media with the optical data media (CF card or USB memory).
STEP1A	Insert the optical data media (CF card or USB memory).
STEP2	Confirm the adapter name and set number.
STEP3A	Overwrite the data that has already been registered.
STEP3B	The internal memory is full. Select environment data that can be deleted.
STEP4	Tighten the adapter firmly in arrow direction. Adapter unsteady or loose degrades measurement accuracy. Do not use tools.
STEP5	After locating the small mark to the center, adjust for uniform brightness with BRT button and push FREEZE button.
STEP6	Remove the optical data media (CF card or USB memory).



NOTE

- The messages of “STEP 3A” and “STEP 3B” will be displayed only if overwrite is required.

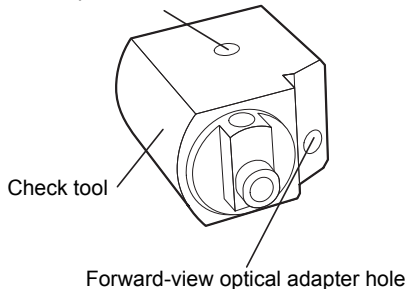
■ Measurement value check

The accuracy of stereo measurement will be reduced by loose attachment of the optical adapter or dirt on the lens components. Routinely perform a check of measurements before and after the actual testing and confirm that the measurement values do not vary considerably.

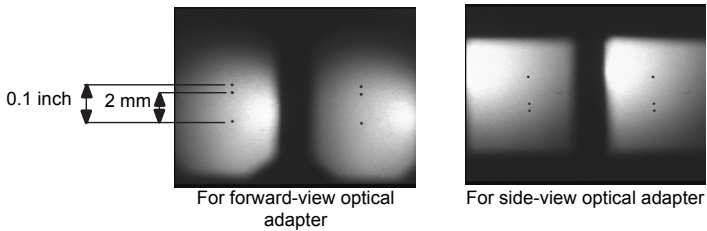
Checking the measurement values

- 1 Insert the scope distal end into the optical adapter hole of the check tool (included with the Stereo Measurement Set) to the end.**

Side-view optical adapter hole



- Turn the check tool so that you see an image similar to the one shown in the figure below.



- Perform the distance mode stereo measurement (see page 145) to measure a known distance of 2 mm or 0.1 inch between two indices.
- Confirm that the measurement accuracy is within $\pm 10\%$ and write down the measurement result.
- Perform the above test measurements before and after the actual inspection to confirm that the obtained values are almost identical.

**CAUTION**

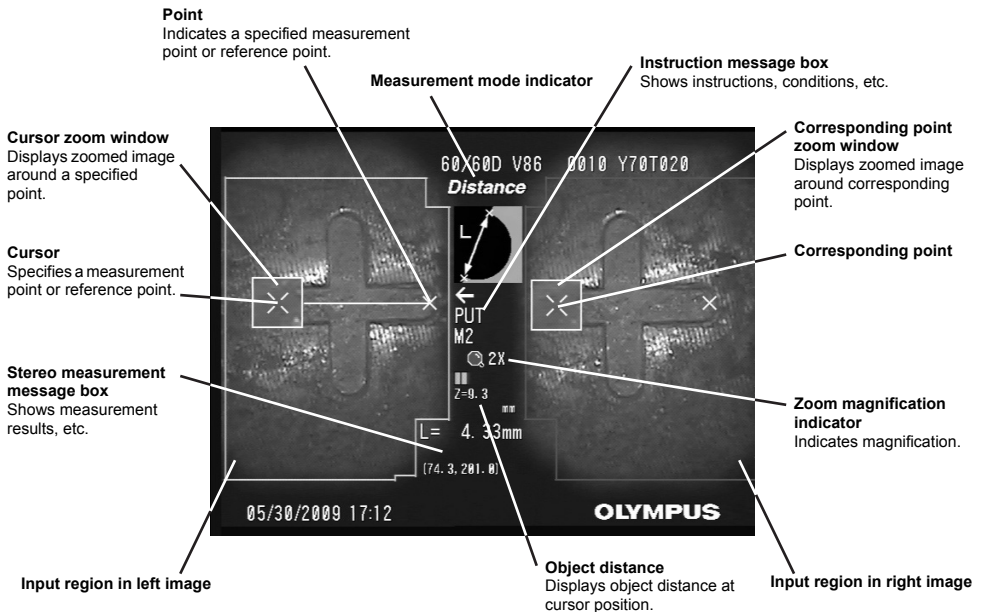
- The measurement values are not reliable if the above values differ from each other considerably. In this case, check that the adapter is not loose and the lens components are not dirty and, if required, execute "Using a new stereo optical adapter (NEW STEREO ADAPTER)" (page 134) and retry capturing the measurement images.

■ Notes for capturing measurement images

- (1) The highlighted part of bright images tend to look textureless. As matching is difficult with these kinds of images, adjust the **BRIGHTNESS** level to darken the image (see “Adjusting the brightness” (page 77)).
- (2) As the illumination comes from one side of the field of view, some objects produce shadows depending on their shapes. Since measurement of shadow tends to result in errors, rotate the scope to remove the shadow before capturing and measuring images.
- (3) In the case that a white reflecting part exists in the measuring area, rotate the scope to remove it, capture and measure images.
- (4) Utilize spot ranging for measuring object distance, capturing the image close to an object and gaining high measurement accuracy (see “Spot ranging” (page 153)). Generally the closer object distance is, the more accurate measurement becomes.

■ Stereo measurement screen

Explanation of the stereo measurement screen

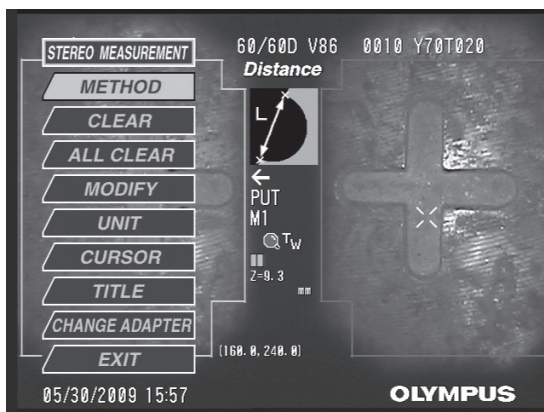


List of messages displayed in the operation instructions message box and the measurement results message box

Message	Description
← PUT M##	Specify measurement point number ## in the input area in the left image.
← PUT R##	Specify reference point number ## in the input area in the left image.
← MODIFY	Measurement point for modifying is selected in the input area in the left image.
→ MODIFY	Measurement point for modifying is selected in the input area in the right image.
← MODIFY M##	Measurement point ## is being modified in the input area in the left image.
→ MODIFY M##	Measurement point ## is being modified in the input area in the right image.
← MODIFY R##	Reference point ## is being modified in the input area in the left image.
→ MODIFY R##	Reference point ## is being modified in the input area in the right image.
OVER 20 PNTS	Up to 20 measurement points can be specified in the measurement region.
CLOSE AREA	Close the measurement area.
NONFUNC	The function of this button is disabled.
WORKING	Please wait while the system is working.
WRONG FIG	Area measurement cannot be performed for the shape.
Measurement unsuccessful. Please retry.	Measurement is not possible if the reference point or image is not suitable for Multi. Change the reference points or capture the image again and then try measuring again.

Menu display and functions of stereo measurement images

Pressing the [MENU/EXIT] button in the measurement screen

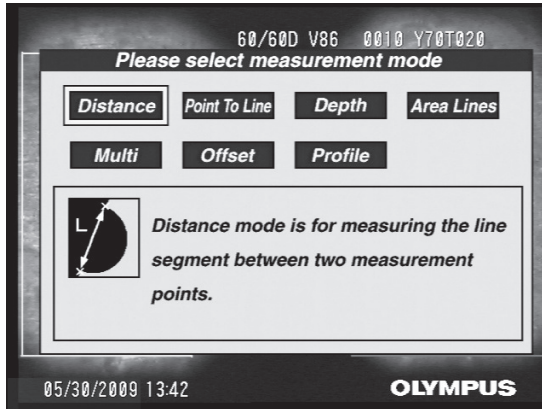


Main menu	Submenu	Description of function
METHOD	—	Selects a measurement mode. See “Selecting a measurement mode” (page 145) for details about operations.
CLEAR	—	Clears the point specified immediately before.
ALL CLEAR	—	Clears all specified points.
MODIFY	—	Modifies a measurement point or corresponding point.
UNIT	—	Selects the units of the measurement result from “mm” or “inch”.
CURSOR	COLOR	Changes the color of cursor and lines.
	STYLE	Changes the shape of cursor.
	SPEED	Changes the speed of cursor.
TITLE	—	Input the title. See “Inputting the title” (page 99) for details about operations.
CHANGE ADAPTER	—	Temporarily changes the selected optical adapter. (Only when retrieving images) See “Changing the optical adapter (with a retrieved image only)” (page 151) for details about operations.
EXIT	—	Exits the stereo measurements, and the display returns to the screen before measurement starts.

■ Stereo measurement procedures

Selecting a measurement mode

The measurement mode selection screen is displayed immediately after executing stereo measurement, or if “METHOD” is selected in the stereo measurement menu screen.

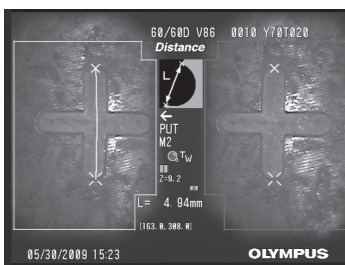


Measurement mode selection screen

The following seven measurement modes are available.

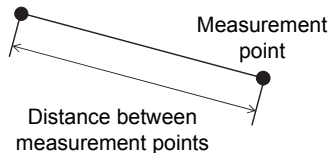
Distance

This mode allows for measuring the distance between measurement points. Place the cursor on each extremity of the object you want to measure and press the [MEAS/ENTER] joystick to specify the measurement points.



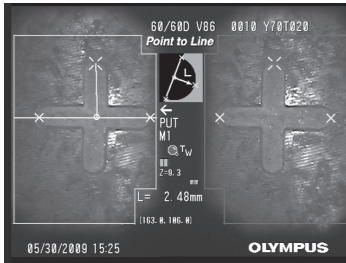
Distance

Measurement point

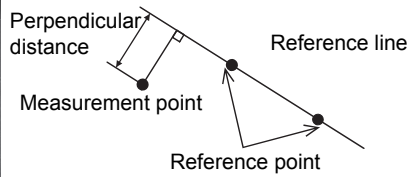


Point to line

This mode allows for measuring the distance from a measurement point to the reference line defined by two reference points.

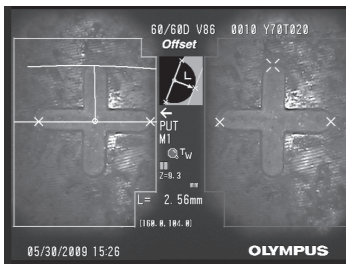


Point to line

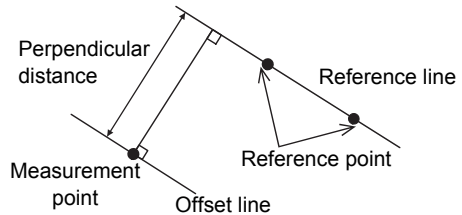


Offset

This mode allows for measuring the distance between a measurement point and a reference line specified by two points, as well as displays an offset line which is through the measurement point and parallel to the reference line. Offset line can be used as a visual guide to judge whether a defect such as material loss or erosion meets inspection criteria.

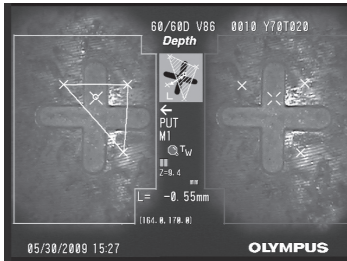


Offset

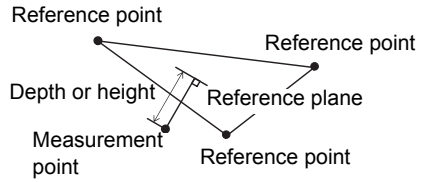


Depth

This mode allows for measuring the distance from a measurement point to the reference plane defined by three reference points. It indicates depth and height. Height is indicated by a positive value and depth is indicated by a negative value.

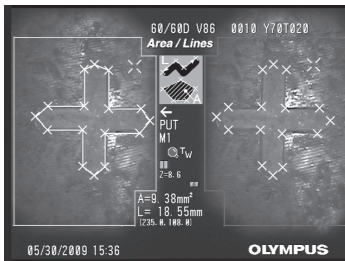


Depth

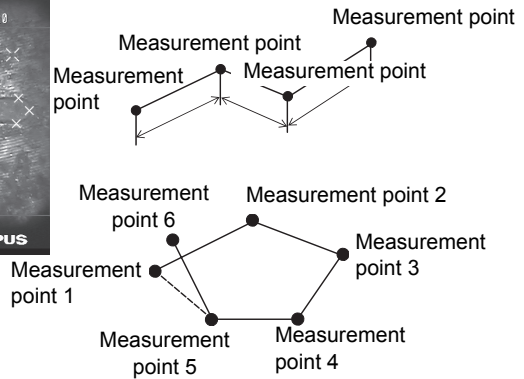


Area/Lines

This mode allows for measuring the total length of multiple lines, each of which is specified by two or more measurement points. When the specification of the last measurement point causes the first-drawn line and last-drawn line to intersect, the area of the figure closed by the lines will be measured. Note that the measured area does not represent the precise area of the measurement target but is only an approximate value obtained by dividing the figure into triangles. Up to 20 measurement points can be specified per measurement session.

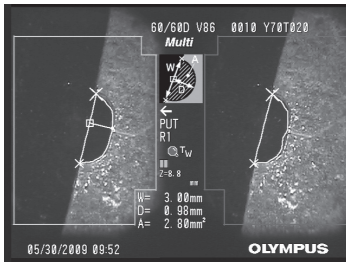


Area/Lines

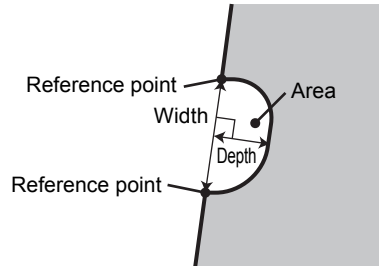


Multi

This type of measurement automatically detects and displays the material lost region between two specified points, and measurements the width, depth and area.



Multi



- 1 Specify reference points by placing the cursor on each extremity of the measurement object and pressing the [MEAS/ENTER] joystick to measure.**

Display the boundary line around the detected material loss region, width, depth, and area on both sides of the top of the screen.

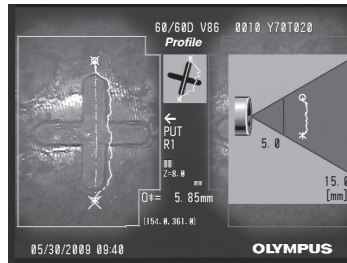


CAUTION

- Material loss may not be detectable if the loss edges are not clearly shown.
- The shape of the material loss must be such that it is on the same plane. Material loss may not be detectable if it is not on the same plane.

Profile

This mode allows for displaying the surface profile obtained by sectioning the target object with a plane defined by the line connecting two specified points and the optical center axis. The image on the left shows the contours of the line that connects the two points. The surface profile graphics overlaid on the right screen shows the profile viewed from the direction that is perpendicular to the Z-axis. The graph shows the result of observation from a direction, from which the reference line on the profile image looks the longest.



Profile

Specifying and moving the measurement points

To move the cursor, tilt the [MEAS/ENTER] joystick in the desired direction. Then, press the [MEAS/ENTER] joystick to specify the required number of measurement points for each measurement mode in the input area for the left image on the left side of the screen.

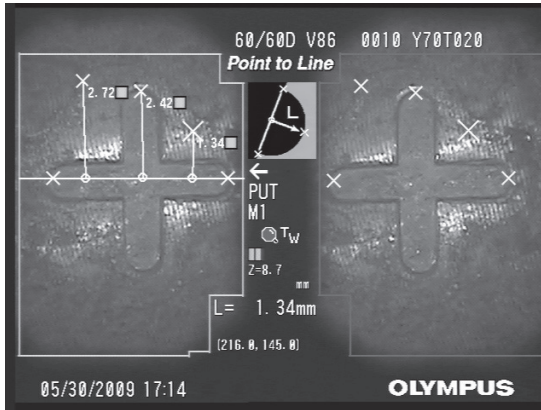
When the measurement mode is distance, point to line, offset, or depth, the measurement results and the object distance measured at the cursor (distance between the distal end of the adapter and the subject) are displayed.

If the measurement mode is area/lines or multi, the object distance measured at the cursor is displayed. The measurement results are displayed by specifying the measurement point.

In addition, the measurement result displaying “- . - - - mm”, indicates that the correct reference point was not automatically acquired.

Displaying the measurement results

If the measurement mode is distance, point to line, offset, or depth, up to three of the most recent measurement results are displayed. The object distance mark (■) indicates the object distance of measurement point. This is displayed to the right side of the measured value. If the measurement mode is area/lines, multi, or profile, only one measurement result is displayed.



Zoom display

When tilting the [ZOOM] lever toward [T] while using stereo measurement, the image around the current position of the cursor and the corresponding point are displayed in both the cursor zoom window and the corresponding point zoom window. When the cursor zoom window is displayed, tilting the [MEAS/ENTER] joystick moves the zoomed image, and the cursor position can be specified. To change the zoom ratio, use the [ZOOM] lever. The zoom ratio can be set to 2X, 3X or 4X. Tilting the lever toward [T] increases the zoom ratio and tilting it toward [W] decreases the zoom ratio.

When the lever is tilted toward [W] while the zoom ratio is 2X, the cursor zoom window and the corresponding point zoom window disappear. If the measurement mode is profile, zoom is not displayed.

Sub-pixel pointing

Sub-pixel pointing specifies finely cursor position at a narrower interval than pixel interval of an original image.

Zoom display automatically activates this function, moving cursor a narrower interval of pixel.

Re-specifying a measurement point

Select "CLEAR" in the menu to delete measurement points specified by mistake.

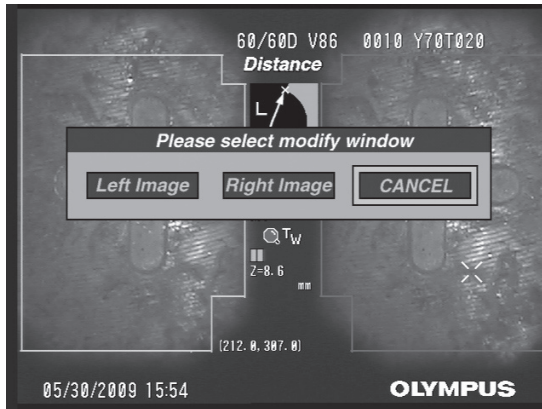
Re-specifying all measurement points

If you want to restart the measurement point specification in an image from the beginning, select "ALL CLEAR" in the menu.

Modifying specified point

To correct the position of a specified point, select “MODIFY” from the menu in the stereo measurement screen. The correction confirmation window opens. If the point to be corrected is in the left image choose “Left Image”. If it is in the right image choose “Right Image”. Choose “CANCEL” to return to the stereo measurement screen.

Next, select a point to be correct by tilting [MEAS/ENTER] joystick and press it. Then move the point by the [MEAS/ENTER] joystick and press it to fix. Press the [MENU/EXIT] button to cancel correction.



Modify window

Matching confirmation and distance display

When matching completes, the corresponding point is displayed in input region in left image. Confirm that the displayed point corresponds to the point specified in input region in left image. At this time, the distance from the scope distal end to the specified measurement point is also displayed as “Z= ~”. The background changes yellow when the distance to the measurement point is over 15 mm or red when it exceeds 30 mm. The distance range up to 15 mm is the recommended measuring range and 30 mm is the maximum measurable range.

In case auto matching is not smooth

Read “Notes for capturing measurement images” (page 142) and “In case accuracy cannot be achieved” (page 152). “MODIFY” can also be used to correct the corresponding point. (Refer to Modifying specified point above.)

Changing the optical adapter (with a retrieved image only)

Select “CHANGE ADAPTER” from the menu to display the stereo optical adapter list. Correct measurements can be done by changing to the same optical adapter that was used to record the retrieved image.

Recording the measurement result

The image with the measurement result is recorded by pressing the [FRZ/REC] button for at least two seconds (long push) when the measurement result is displayed.

Exiting from measurement

Press the [LIVE/GAIN] or [VIEW] button to display exit measurement screen and then select “OK” to exit measurement. Select “CANCEL” to return to the stereo measurement screen.

Select “EXIT” in the stereo measurement menu to exit measuring and return to the screen before measurement is activated.



Exit measurement confirmation window

■ In case accuracy cannot be achieved

- (1) Bring the scope as close as possible to the object so that the screen is filled with the object.
- (2) Measure the length so that it is parallel with the screen whenever possible. While the resolution of measuring is high when the measuring direction is parallel with the screen, it gets low when measuring direction becomes closer to depthwise. Therefore, the measurement can be made more accurate by measuring a parallel object to the screen.
- (3) Change the point of view and capture an image again if the objects have similar patterns around measurement points have few surface characteristics or if the image is blurry or reflective.
- (4) Check that the optical adapter is attached properly to the scope.

- (5) Check that there is no dirt between the optical adapter and scope, and attach the optical adapter again.
- (6) If the accuracy still cannot be improved, execute “NEW STEREO ADAPTER” again (see page 134).

**NOTE**

- Check the accuracy by performing test measurements using the check tool before and after the actual measurement.
- Note that the area measurement is only an approximate value and does not provide correct measurement of the surface area of the object.

■ Spot ranging

The spot ranging function calculates the distance between the distal end of the optical adapter and the subject. In live images move the distal end of the scope slowly because vibration makes it impossible to calculate measurements.

1 Selecting the optical adapter

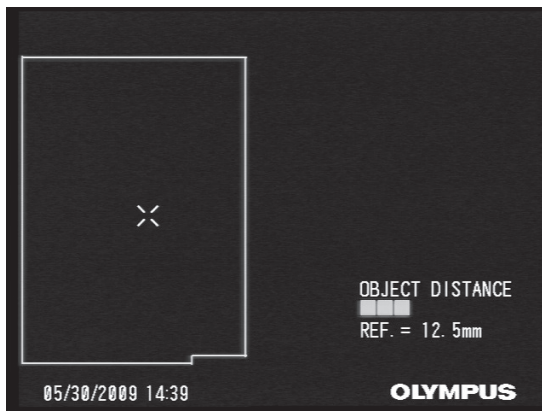
Before executing the object distance measurement, select the stereo optical adapter to be used by referring to “Stereo optical adapter selection” (page 132).

2 Executing object distance measurement

(1) In live, frozen, and retrieved images

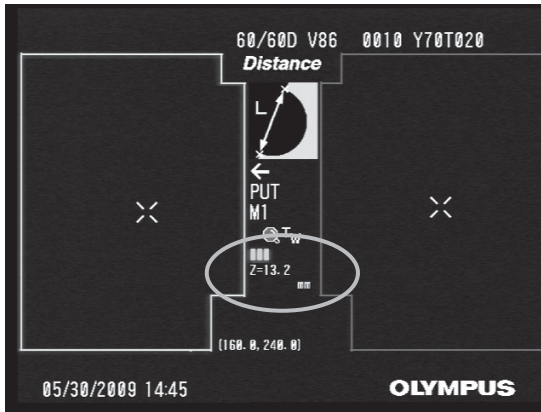
To perform the object distance measurement, display the live, frozen or retrieved image to be measured and tilt the [ZOOM] lever toward [W]. The object distance measurement is displayed.

Tilt the [ZOOM] lever on the control unit towards [T] to exit the object distance measurement function.



(2) In stereo measurement images

Object distance is always measured during stereo measurement.



CAUTION

- Object distance measurement cannot be done when recording moving images or when doing profile measurement.

3 Displaying the measurement results

Measure the object distance at the position of the cursor in the left image. The object distance indicator shows the distance between the distal end of the optical adapter and the subject by nine levels.

- Up to 15 mm: ■■■ ← green
- Up to 30 mm: ■■■■■ ← yellow
- 30 mm and higher: ■■■■■■ ← red

4 Moving the measurement point

To move the cursor, tilt the [MEAS/ENTER] joystick in the desired direction.

6.2 Using reference length to measure object length (scaler measurement)

Scaler measurement is done by using an object in the observation screen that has a known length as a reference length and then using that value to measure the length of the object.



CAUTION

- If the reference length is not correct, high accuracy cannot be achieved. Also, do a preliminary measurement to assure that the object that will be the reference and the object that will be measured are positioned with the same optical axis and perpendicularity.

■ Attaching the optical adapter

- 1** Attach optical adapters, other than stereo optical adapters, to the scope distal end by following the procedure described in “Attaching and detaching the optical adapter” (page 52).
- 2** The type of optical adapter is automatically recognized when it is attached while the live screen is displayed and a message like the one shown below is displayed.



- 3** Make sure that the name of the optical adapter is correct.

- 4** The following message is displayed when the optical adapter is removed. Press the [MEAS/ENTER] joystick to delete the message.

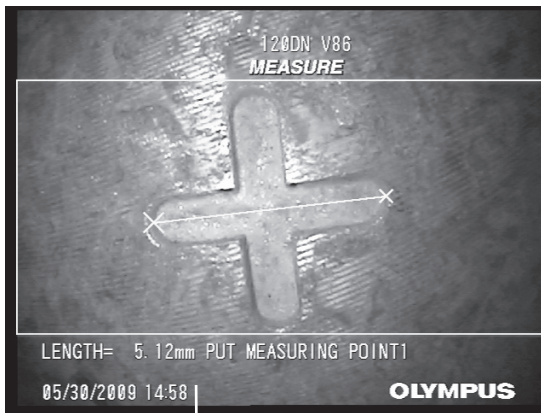


CAUTION

- The operation above is not done except when the optical adapter is attached in the live screen. It is executed when the live screen is displayed.

■ Scaler measurement screen

Explanation of the scalar measurement screen



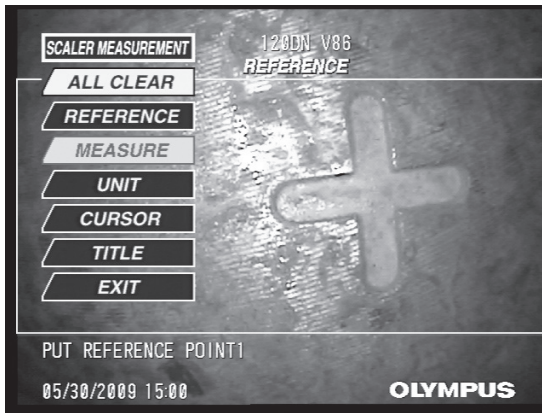
Scalar measurement message box

Shows operating instructions, measurement results, etc.

List of messages displayed in the message box

Message	Description
PUT REFERENCE POINT1	Specify the first reference point.
PUT REFERENCE POINT2	Specify the second reference point.
INPUT REFERENCE LENGTH = 000.00mm	Specify the reference length.
PUT MEASURING POINT1	Specify the first measuring point.
PUT MEASURING POINT2	Specify the second measuring point.

Menu display and functions of the scalar measurement screen



Main menu	Submenu	Description of function
ALL CLEAR	—	Initialize measurement.
REFERENCE	—	Sets new reference length.
MEASURE	—	Sets new measurement point.
UNIT	—	Changes the units of the measurement result. Select “mm” or “inch”.
CURSOR	COLOR	Changes the color of the cursor and lines.
	STYLE	Changes the shape of the cursor.
	SPEED	Changes the speed of the cursor.
EXIT	—	Closes the menu.

■ Scaler operating procedure

1 Startup

Display the image to be measured and press the [MEAS/ENTER] joystick.

2 Reference point specification

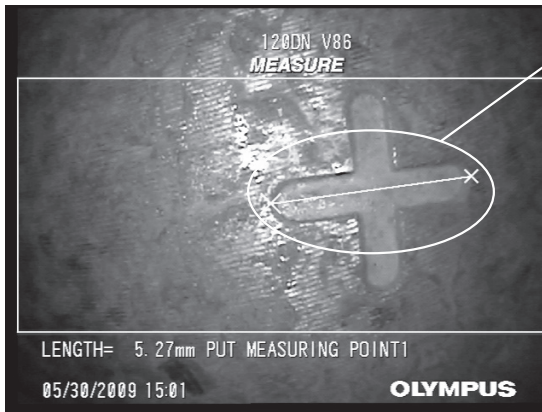
Place the cursor on each extremity of an object with a known length in the observed image and press the [MEAS/ENTER] joystick.

3 Reference length specification

When the reference length input message is displayed, input the known length by tilting the [MEAS/ENTER] joystick up/down and left/right, and press the [MEAS/ENTER] joystick to enter it.

4 Measurement point specification

Place the cursor on each extremity of the measurement object and press the [MEAS/ENTER] joystick to measure its length.



Specifying the measurement point

5 Exit

Press the [LIVE/GAIN] button to display the exit measurement screen and then select "OK" to exit measurement. Select "CANCEL" to return to the stereo measurement screen.

Select "EXIT" in the scalar measurement menu to stop measuring and return to the screen before measuring was activated.

Chapter 7 Operations on a computer

7.1 Using recorded images on a computer

You can use bundled IPLEX VIEWER PLUS to access images recorded with IPLEX FX on a computer.

Images can be read directly to a computer from the media on which they are recorded or the images can be moved or copied to the computer from the base unit via a USB connection. Contact Olympus for details about connecting to a computer.






■ Reading images with a computer

For details about how to open IPLEX FX images with IPLEX VIEWER PLUS, see the IPLEX VIEWER PLUS instruction manual.

Chapter 8 Storage and maintenance

8.1 Remaining battery power

When operating IPLEX FX with the battery, the LCD monitor displays the remaining battery power on the top right of the screen. A guideline to remaining battery capacity is shown as follows.

(1)		Remaining battery power about 50%.
(2)		Remaining battery power about 25% to 50%.
(3)		Remaining battery power about 5% to 25%.
(4)		Remaining battery power about 2% to 5%.
(5)		Remaining battery power about 1% to 2%. This indicator flashes. Replace with a battery that has been charged with the charger.



CAUTION

- Do not record, copy, move, or delete images and do not format recording media if warning number (4) shown above is displayed. If the power runs out during these operations the data could be corrupted.



NOTE

- If the battery continues to be used after the warning above (5) is displayed, the system will be shut down automatically to protect the battery against excessive discharge.
- The remaining battery power can also be checked on the [POWER INDICATOR] of the battery itself. (However, the remaining battery power shown on the LCD monitor is different.) Press the [CHECK] button on the battery. The green LEDs will light according to the remaining battery power. For details, refer to the instruction manual of your battery.
- Even when two of the green remaining power indicator LEDs on the battery are lit, the IPLEX FX may shut down automatically when that battery is used. This is a measure performed by the base unit to protect the battery against excessive discharge. It occurs more often when the ambient temperature drops, but it is not a malfunction. If this happens, recharge the battery before reusing it.
- The remaining battery power is not displayed during the AC adapter-powered operation.

- When long hours of battery-powered operation are expected or when using the instrument in cold weather, it is recommended to prepare charged batteries as spares.
 - When the battery operation time becomes extremely short, it is recommended to replace the battery with a new battery.
 - The base unit is not provided with charging capability. To charge the battery, use the optional external battery charger.
-

8.2 Replacing the battery



DANGER

- Before opening the battery cover, press the [POWER] button to turn off the power (the POWER indicator turns off). Not doing so may cause an electric shock.



WARNING

- Be careful not to injure yourself when replacing the battery.
- Never use a battery other than the one designated 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.

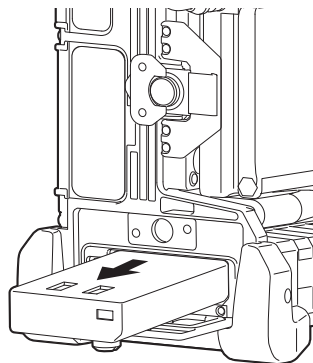


CAUTION

- Be careful not to accidentally drop the battery during replacement.
 - If the battery inlet is pointed upward, the internal battery may not come out.
-

■ Replacing the battery

- 1** Press the [POWER] button on the base unit to turn off the power (the [POWER] indicator goes off).
- 2** Loosen the battery cover screws to open the battery cover.
- 3** Open the claws on the battery inlet until it clicks, and the battery will come out.



- 4** Grasp the battery and remove it.
- 5** See “Supplying power from the battery” (page 36) for information about putting in a new battery.

8.3 Cleaning



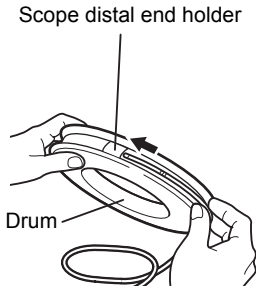
CAUTION

- Clean the scope immediately after withdrawing the scope. If you leave it uncleaned, the equipment may be stained or corroded.
 - Do not use a hard cloth or hard brush for cleaning the scope. Otherwise, the scope may be damaged.
 - Do not clean the equipment and the optical adapter under running water. Otherwise, the equipment and the optical adapter may be damaged.
-

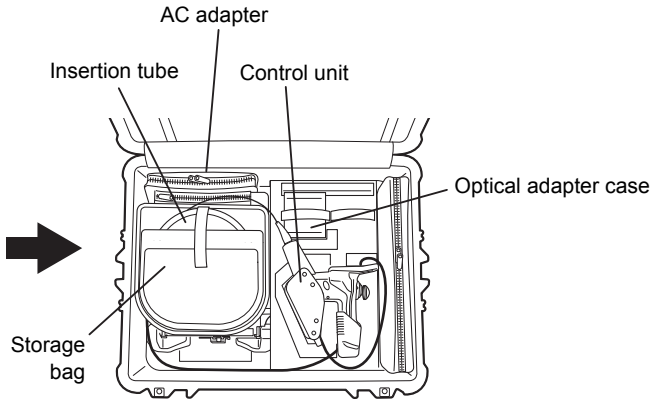
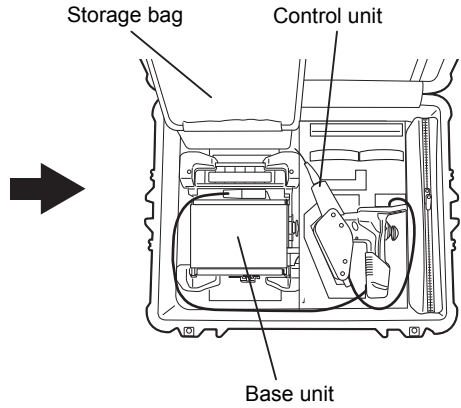
- 1 Use a clean, soft cloth to wipe any dirt or other foreign matter off of the scope or base unit. Also thoroughly wipe all dirt, water, and other foreign matter from the battery cover, interface connector, slot cover, interior of the AC adapter cover, and the locations where the scope unit connects to the base unit.**
- 2 If a liquid such as wastewater or machine oil is attached to the scope or base unit, first wipe it with a soft cloth or cotton, and wash well using a neutral detergent solution and pieces of gauze. Then wipe it with a piece of soft gauze moistened with clean water, wipe off the moisture well and dry.**
- 3 Inspect and clean the distal end of the scope and the optical adapter according to “3.5 Inspecting the scope” (page 39) and “3.7 Inspecting the optical adapter” (page 51).**

8.4 Repacking the case

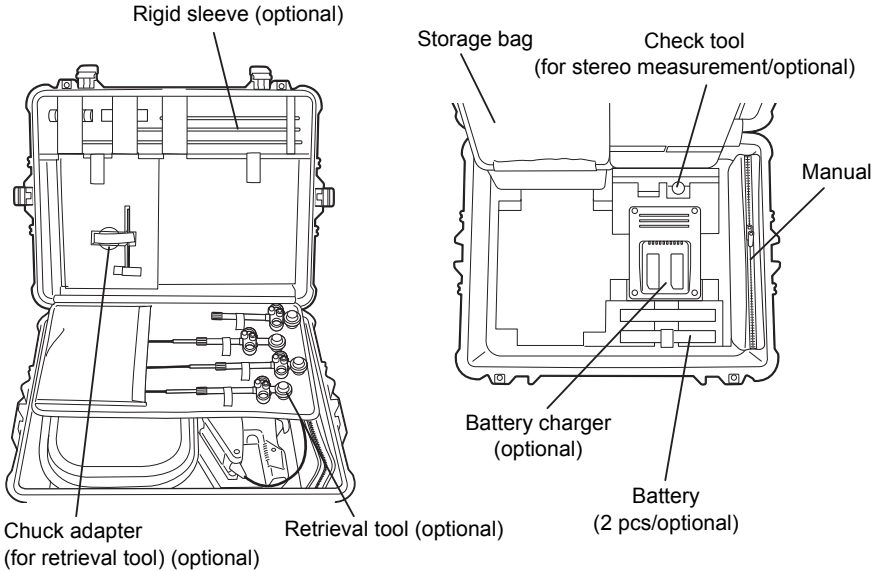
Repack the equipment in the order of: **Base unit** → **Control unit** → **Insertion tube**.



Wind the insertion tube around the drum.



Stow accessories as illustrated below.



! WARNING

- Before storing the base unit in the case, be sure to remove the battery and turn the base unit off. Otherwise, the equipment may overheat and cause a fire.

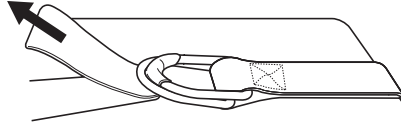
! CAUTION

- Be sure to use the drum when storing the insertion tube.
- Do not use an excessive force when inserting the insertion tube distal end into the distal end holder. Otherwise, the insertion tube may be damaged.
- Make sure to remove twist from the insertion tube when winding it.
- Do not use an excessive force when winding the insertion tube around the drum. Otherwise, the insertion tube may be damaged.
- Do not apply an excessive force to the insertion tube when putting the drum around which it is wound in the storage bag.
- Make sure that the case's latch is locked properly. If it is locked improperly, the top cover may open during transport.
- When closing the top cover, be careful that your hand, the strap, insertion tube, cables or the inner cover are not pinched.
- When returning the base unit to its case, open the case in a stable place before repacking the equipment.
- Use only the designated case. Otherwise, the scope unit and/or base unit may be damaged or malfunction.

■ Secure the case with the belt

The top cover of the case may open if the case is hit while being moved. As shown in the diagram below, when the case is shipped, the top cover is secured using the enclosed belt to prevent it from opening.

Run the belt through the loops and pull it in the direction shown by the arrow to tighten it.



CAUTION

- Do not pinch your fingers while tightening the belt.
 - Position the buckle so that it is not on the case's corner or projections.
-

8.5 Cleaning/storing the hook assembly (IV8635X1 only)

■ Cleaning the hook assembly



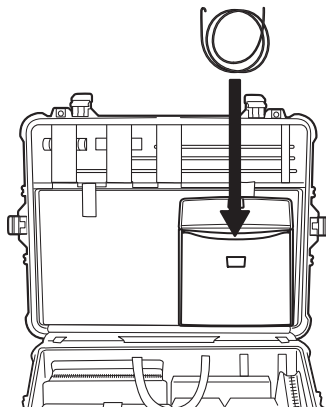
CAUTION

- During cleaning, take care not to bend the spring shaft into a small curvature radius or apply an excessive force to the hook.

- 1** Remove the hook assembly by reversing the procedure steps described in section “4.2 Attaching the hook assembly (IV8635X1 only)” (page 66).
- 2** If the hook assembly is contaminated by soil or oil, wash it away with a cleaning fluid such as neutral detergent, rinse well and dry completely.

■ Storing the hook assembly

- 1** Take out the hook assembly case from carrying case.
- 2** Wind the hook assembly and place it in the hook assembly housing in the carrying case. (Two hook assemblies can be stored in the hook assembly housing.)





CAUTION

- When storing the hook assembly into the hook assembly housing, roll the hook assembly to a curvature radius of 100 mm or more. If the hook assembly is rolled with a lower curvature radius, the assembly may be deformed permanently.
 - Take care so that the hook assembly does not protrude from the hook assembly housing.
-

8.6 Storage precautions

Store the equipment under normal room temperature and humidity conditions.



DANGER

- Do not bend, stretch, twist or crush cables with excessive force. Otherwise, a break in a cable may result in a fire or electric shock hazard.



CAUTION

- Do not store the equipment in a place subject to high temperature, high humidity, excessive dust or fine particles, direct sunlight or radioactive emissions. Doing so could damage the equipment.
- 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. Do not store the equipment in a place subject to the gas including halide. Doing so could damage the equipment.
- Do not handle the equipment roughly or hit it against other objects when storing it. Doing so may cause a malfunction.

1 Turn the [POWER] button off and remove the battery and the AC adapter from the base unit.

2 Store the equipment on a level surface in a clean, dry and stable place.

Chapter 9 Troubleshooting



DANGER

- 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 “Chapter 3 Preparation and inspection before observation”, do not use the equipment if there are any obvious malfunctions. Contact Olympus for repairs. Should the slightest irregularity be suspected, do not use the instrument and see “9.1 Troubleshooting guide” (page 171). If the problem cannot be resolved by the described remedial action, stop using the instrument and send it to Olympus for repair.

Olympus does not repair disposable accessory parts. In the case of malfunction, contact Olympus to purchase a replacement.

9.1 Troubleshooting guide

■ Error messages

Problem	Display	Possible cause	Remedy
A message appears when scope is inserted into high-temperature observation object.	High Temperature around scope. Withdraw scope immediately.	The message is informing you that the self-check function was triggered to prompt termination of inspection.	Immediately pull the scope out of the observation object. (Note) Message will appear before the atmospheric temperature of the distal end of the scope reaches the operating maximum ambient temperature.
Message display when the optical adapter is attached.	UNKNOWN OPTICAL ADAPTER IS ATTACHED.	The optical adapter type is not being detected correctly.	Clean the electrodes and then attach the optical adapter again (see "3.7 Inspecting the optical adapter" (page 51)).
Message display during inspection.	OPTICAL ADAPTER IS DETACHED.	The attached optical adapter is loose.	Stop inspection and securely reattach the optical adapter.
	ERROR (AD1) Please shut down the power and clean the electrodes of optical adapter and scope distal end.	An abnormality was detected in the scope tip electrode or optical adapter electrode.	Immediately withdraw the scope from the object of observation and turn the power off. Clean the scope tip and optical adapter electrodes, and then reinstall the optical adapter. See "3.5 Inspecting the scope" (page 39) and "3.7 Inspecting the optical adapter" (page 51).
The light emitted by the scope will not increase.	ILLUMINATION CANNOT BE INCREASED.	The distal end of the scope is hot.	Wait until the scope distal end cools before using it.
Message display while the light emitted by the scope is increased.	ILLUMINATION RETURNED TO NORMAL.	The distal end of the scope is hot.	Wait until the scope distal end cools before using it.

Chapter 9 Troubleshooting

Problem	Display	Possible cause	Remedy
The angulation operation is extremely heavy.	ERROR (A1)	The insertion tube is overloaded and the self-check function was triggered to prompt termination of inspection.	Extend the insertion tube as much as possible to reduce the loop amount, and turn power back on without operating the [ANGLE] joystick.
Message displayed during menu operations.	ERROR (M1)	The memory is not stable.	Stop inspection and turn the instrument off then on again.
Message display when using battery.	LOW BATTERY! PLEASE USE AC ADAPTER OR OTHER BATTERY IMMEDIATELY.	The battery voltage dropped when using battery.	Stop recording, copying, moving, deleting images, or formatting recording media and quickly replace the battery. Or, plug in the adapter.
	ERROR (LV1)	The battery is almost dead.	Stop inspection and replace the battery.
Self-check triggers during use and displays a message.	ERROR (BT1)	Head has built up inside the base unit triggering the self-check function to prompt termination of inspection.	Terminate inspection, allow the instrument to cool down, and then turn power back on again. If you are using battery power, replace the battery ("8.2 Replacing the battery" (page 162)).
	ERROR (D1)	The self-check function is activated and urges termination of inspection.	Stop inspection and turn the instrument off then on again.
	ERROR (SU1)		

Problem	Display	Possible cause	Remedy
Image cannot be recorded or retrieved.	ERROR (MP1)	An attempt was made to retrieve a unsupported file.	Stop inspection and turn the instrument off then on again.
		An attempt was made to insert or remove a recording card or USB memory while recording a movie.	
	THIS IMAGE CANNOT BE RETRIEVED.	An attempt was made to retrieve files recorded in different TV formats.	Ensure that the files to be retrieved employ the same TV format.
		The image has not been recorded with the IPLEX FX.	Only images recorded with the IPLEX FX can be retrieved.
		When retrieving an image file that has been either moved or copied from a recording card or internal memory to a USB memory.	Move or copy moving images from a recording card or internal memory to a USB memory to play on a computer.
	RECORDING MEDIA NOT READY.	An attempt was made to access the recording media while no recording media was inserted. Or, the recording media was removed during operation.	Insert a recording card or USB memory to use and restart operation.
	RECORDING MEDIA ERROR.	The recording media is not formatted or the data being accessed is damaged.	Format the recording card or USB memory with the IPLEX FX.
	RECORDING MEDIA FULL.	The recording media is full.	Delete unneeded data to free up space or replace with new media.
		An attempt was made to create a new folder while the card already contains the maximum number of folders.	Reduce the number of folders or use new media.
		An attempt was made to record an image file while a file with the maximum serial No. already exists in the folder.	Record the image file in a new folder or use new media.

Problem	Display	Possible cause	Remedy
Image cannot be recorded or retrieved.	INTERNAL MEMORY ERROR.	Internal memory card is not formatted or the data being accessed is damaged.	Try again, or turn power off and then back on again.
	INTERNAL MEMORY FULL.	Internal memory is full.	Delete unneeded data to free up space into the internal memory.
		An attempt was made to create a new folder while the card already contains the maximum number of folders.	Reduce the number of folders into the internal memory.
		An attempt was made to record an image file while a file having the maximum serial number already exists in the folder.	Record the image file in a new folder.
	RECORDING MEDIA NOT READY. STORE TO INTERNAL MEMORY?	An attempt was made to record an image file while recording media is not loaded.	To store the file to internal memory, select "OK". To store the file to other media besides internal memory, select "CANCEL", load the media to be used, and then store the image file.
A message appears when you save an edited note.	Changes cannot be saved. Please insert the RECORDING CARD (CF card).	An attempt was made to record a note while a recording card was not loaded.	Insert a recording card (CF card) and save the note again.
An error message appears when recording media is inserted.	Please format the RECORDING MEDIA.	The recording media that is inserted is not FAT16 format.	Format the recording media on a computer and insert it into the main unit again.
An error message appears when a USB device is connected.	ERROR (USB1) Please detach connected USB devices.	The USB device consumes 500 mA or more of electrical current.	This type of USB device is not supported. Use only recommended USB memory devices.

■ General troubles during operation

Problem	Possible cause	Remedy
The illumination does not light.	The [LIGHT] button is not on.	Turn on the [LIGHT] button.
	The optical adapter is attached improperly.	Attach the optical adapter properly.
	Electrodes on the optical adapter or the scope distal end are dirty.	Wipe them clean using a soft piece of gauze, a cotton swab, or a brush. See “Inspecting the scope distal end” (page 39) and “Inspecting the optical adapter optics and connecting screw threads” (page 51).
	The LED on the distal end of the optical adapter is out.	Replace the optical adapter.
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.
The optical adapter cannot be attached to the scope.	A foreign object is stuck to the screws.	Wipe them with a clean piece of gauze or cotton swab.
	The optical adapter in use is not a designated optical adapter for this system.	Use a designated optical adapter.
	You are not using the proper installation procedure.	Redo it correctly (See “Attaching and detaching the optical adapter” (page 52).)
The optical adapter cannot be removed from the scope.	The nut of the optical adapter is rotated in the wrong direction.	Redo it correctly (See “Attaching and detaching the optical adapter” (page 52).)
The system cannot be turned on.	The AC adapter or the battery is not connected.	Connect the AC adapter or the battery correctly. (See “3.4 Preparing the power supply” (page 36).)
	The [POWER] button is not set to on.	Set the [POWER] button of the base unit to on.
	A non-designated AC adapter or battery is connected.	Use the designated AC adapter or battery.
	The scope unit is not connected improperly.	Connect the scope unit properly.

Problem	Possible cause	Remedy
The system cannot be turned off.	The base unit is damaged.	Remove the AC adapter or the battery from the base unit to turn off the power.
Image is not displayed.	The LCD monitor is connected improperly.	Connect the LCD monitor properly.
	The LCD monitor is off.	Turn the LCD monitor on.
	The scope unit is connected improperly.	Connect the scope unit properly.
The image is not sharp.	The object lens on the scope distal end or the optical adapter is dirty.	Wipe it with a clean piece of gauze or cotton swab.
	The optical adapter is attached improperly.	Attach the optical adapter properly.
	The external monitor is adjusted incorrectly.	Correctly adjust the external monitor.
	"ENHANCE" in the IMAGE setup menu is set to "LOW".	"ENHANCE" in the IMAGE setup menu is set to "LOW". Set it to "MED" or "HIGH".
The image brightness is not optimum.	The GAIN mode, automatic brightness control or EXPOSURE is set erroneously.	Perform the applicable button or menu operation to configure the proper setting.
	The object lens on the scope distal end or the optical adapter is dirty or the illumination on the optical adapter distal end is dirty.	Wipe them with a clean piece of gauze or cotton swab.
	The external monitor is adjusted incorrectly.	Correctly adjust the external monitor.
	The optical adapter is old.	Replace the optical adapter.
Color reproduction is poor.	The white balance is set improperly.	Re-adjust the white balance.
The image is noisy.	The GAIN mode, automatic brightness control or EXPOSURE is set erroneously.	Adjust them properly.
	The GAIN mode is set to "BOOST".	Set the GAIN mode to "STANDARD".
Angulation cannot be returned to its original attitude.	The angulation lock is set.	Lift the [ANGLE LOCK] lever to release the angulation lock.

Problem	Possible cause	Remedy
Angulation cannot be locked.	A stopper is installed.	Remove the stopper and then operate the [ANGLE LOCK] lever.
Operation load for articulation is getting heavier.	Angle lock function may effect.	Pulling down the [ANGLE LOCK] lever.
Control unit is emitting loud noise or vibrating violently.	The insertion tube is overloaded.	Remove your finger from the [ANGLE] joystick and then extend the insertion tube as much as possible to reduce the loop amount.
A folder cannot be deleted.	The folder contains a file or folder named using more than 39 characters.	Insert the CF card in a computer and delete the folder by using the computer.
Audio is not heard during reproduction of still image or moving images with audio.	“AUDIO VOL” in the “SET UP” menu is set to “OFF”.	Set “AUDIO VOL” in the “SET UP” menu to anything except “OFF”.
	A moving image without audio is being played.	Audio is not output when such a moving image is played.
The beep can not be heard.	“AUDIO VOL” in the “SET UP” menu is set to “OFF”.	Set “AUDIO VOL” in the “SET UP” menu to anything except “OFF”.
All the functions stopped during motion image recording.	A recording card not recommended by Olympus was used.	Remove the AC adapter or the battery from the base unit to turn off the power. Use a recording card recommended by Olympus.
If accuracy of stereo measurement cannot be achieved, see “In case accuracy cannot be achieved” (page 152).		

■ Messages displayed during stereo measurement

ERROR#	Description
501	Optical data is not recorded.
502	Optical data is destroyed. Contact Olympus.
503	The optical data version is different. Contact Olympus.
504	The outer diameter of the optical adapter is different. It cannot be used.
505	A system error occurred. Contact Olympus.
506	The white image is not optimal. Freeze images again.
507	A system error occurred. Contact Olympus.
601	There is erroneous data, delete the data.
701	Measurement is not possible with zoomed-in images. Freeze images again.
703	Measurement is not possible with digitally processed images.
704	Measurement is not possible with captured images.
705	Measurement is not possible with field images.
706	Measurement is impossible because the optical adapter type is not compatible with the current environment.
707	Measurement is impossible because the images were recorded with another system.
708	Measurement is impossible because the optical adapter installation angle differs from the registered environment data.
709	Measurement is impossible because the data in the measuring environment used in freezing the images is not available.
710	Measurement of color bars is impossible.
711	Measurement is impossible because the images were recorded using a different insertion tube.
801	Unfreeze the images.

9.2 Returning the instrument for repair

**WARNING**

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

**CAUTION**

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

Before returning the instrument for repair, contact Olympus. 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.

Chapter 10 Specifications

10.1 Operating environment

Operating temperatures	Insertion tube	In air : -25 to 100°C In water: 10 to 30°C (*1)
	Other parts than above	In air : -21 to 49°C (Battery-powered operation) 0 to 40°C (AC adapter-powered operation)
Operating atmospheric pressure	Insertion tube	In air : 1013 hPa Under water: 1013 to 1772hPa (*1)
	Other parts than above	In air : 1013 hPa
Operating environment humidity	All parts	15 to 90% (Relative humidity)
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: Can be used underwater with the optical adapter attached. Underwater stereoscopic measurement is not possible. (*1)
	Other parts than above	Rain-proof: Cannot be used under water. However, it is not rain-proof when the battery cover and others are open.

*1 The IV8635X1 cannot be used under water.

10.2 Other specifications

Scope unit	Optical system	Field of view	Can be changed according to the optical adapter. Optical adapter for stereo measurement can also be attached.
		Direction of view	Variable for direct viewing or side viewing depending on the optical adapter.
		Depth of field	Refer to specifications for depth of field for optical adapter.
		Illumination	2-stage LED illumination system
	Distal end	Outer diameter	IV84 series: ϕ 4.0 mm IV86 series: ϕ 6.0 mm IV8635X1 : ϕ 6.2 mm
		Distal end rigid section length	See the distal end rigid section length specification of the optical adapter in use.
		Angulation	IV8420, IV8435: 130° IV8620 : 150°, IV8635: 130°, IV8650 : 110°, IV8675: 90°, IV8635X1 : 120° * UP, DOWN, RIGHT and LEFT each direction. The insertion tube is straight.
	Flexible section	Flexibility	IV84 series: Fixed hard tube from the distal end of the insertion tube to the control unit. IV86, IV8635X1 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 IV8635X1 : ϕ 6.2 mm
		Index lines	IV84 series, IV86 series: An orange line is drawn at the position of 500 mm from the distal end of the insertion tube. White lines are drawn at every 1000 mm from the distal end of the insertion tube. The number of white lines is increased at every 1000 mm (1 line at 1000 mm, 2 lines at 2000 mm). IV8635X1: Six white lines and five orange lines are displayed at 20 mm intervals from a position 300 mm from the tip of the insertion tube, and ten white lines are displayed at 20 mm intervals from a position 2350 mm from the tip of the insertion tube.

Scope unit	Channel inner diameter		IV8635X1: ϕ 1.6 mm
	Total length		IV8420: 2 m IV8435: 3.5 m IV8620: 2 m IV8635: 3.5 m IV8650: 5 m IV8675: 7.5 m IV8635X1: 3.5 m
	Control unit	Angulation	Power assisted angulation.
		Function of buttons	ZOOM (UP/DOWN) lever Magnification of zoom changes smoothly.
			BRT (UP/DOWN) lever <In the live screen> Brightness changes in UP/DOWN format. <BRT UP lever in the thumbnail screen> Selects multiple images to delete, copy, or move.
			ANGLE joystick Used to control the angulation.
			MEAS/ENTER joystick Used for menu selections and measuring
			MENU/EXIT button Toggles the menu display on and off.
			LIVE/GAIN button Returns to the live screen from the menu screen Switches the gain mode in the live screen.
			FRZ/REC button Freezing function and recording function done by one button. Short push opens freeze screen. Long push activates recording function.
VIEW button Short push displays most recent image on retrieve screen. Long push opens thumbnail screen.			
ANGLE LOCK lever Mechanically locks and maintains angulation.			
Dimensions	IV84, IV86 series: 311 (W) x 93 (D) x 192 (H) mm IV8635X1: 365 (W) x 93 (D) x 192 (H) mm (without insertion tube and cable)		
Weight	Approx. 750 g (without insertion tube and universal cable)		
Weight		IV8420, IV8620: 1.7 kg IV8435, IV8635, IV8635X1: 1.9 kg IV8650: 2.0 kg, IV8675: 2.2 kg	

Base unit	Mode of installation		Can be placed either on its side or on its base.
	Portability		Can be fitted to body with a shoulder strap.
	Holding of control unit		Provided with a hook for temporary locking of the control unit.
	LCD	All-around	Adjustable brightness LCD on and off is synchronized with on/off action of the base unit. LCD can also be turned on or off by itself. A sunshade protects the screen when it is closed. It can be attached and removed from the base unit with holding screws.
		TV format	Each unit is designed exclusively for either NTSC or PAL.
		LCD panel	TFT full color liquid crystal display panel module. Transparent panel
			6.5 inch image size
			Anti-reflective type
	Function of buttons		POWER: Turns power ON/OFF LIGHT : Short push turns illumination ON/OFF. Long push increases light emission.
	Indicator		POWER indicator: Indicates power is on or off. LIGHT indicator : Indicates illumination light is on or off.
	Scope screen		Full screen
	Bright adjustment		9 steps each.
	High speed electronic shutter and exposure range		NTSC: 0.5 to 1/30000 second PAL : 0.5 to 1/25000 second
Freeze frame (still image display)		Automatically selects frame freeze when there is little motion in the screen or field freeze when there is a lot of motion in the screen. However, the still images obtained with the stereo adapter are always frame images.	
Noise reduction		Two settings to reduce static interference in images.	

Base unit	Zoom		Electronic zoom magnifies the image smoothly up to 3X.
	White balance		White balance can be readjusted by selecting white balance in the menu. It is a simple operation adjusted by capturing an image of a white object.
	Contrast correction		Corrects the contrast of a frozen or retrieved image. There are five correction levels.
	RECORDING CARD slot		One CF card slot for recording cards and optical data cards for stereo measurement.
			A CF card (1 GB) is included as a recording card. Operation is not certified except with the card provided or cards recommended by Olympus.
	Input/Output connector	Video signal outputs	Two video signal outputs (For external devices) (1) Composite (VBS) video output One BNC jack output. (2) Y/C (S) video output One S video connector output
			Video output standards: Based on RS170A format (full commonality) Output impedance 75 ohm (full commonality)
		Microphone input	φ3.5 mm monaural mini jack (for plug-in power)
		USB connector	A connector, Ver.1.1 standards
		Extension connector	AUX connector
Power supply	Battery	Specified battery can be inserted and removed from the battery slot. Only the specified battery is permitted: Specified battery (Lithium Ion) Model name: Manufactured by IDX NP-L7S Nominal voltage: 14.8 V Battery powered operating time: 150 minutes or longer (based on with a new battery) For details, refer to the instruction manual of your battery.	

Base unit	Power supply	AC adapter	Designated AC adapter can be connected to AC adapter connector. Rated input voltage : 100 V to 240 V Supply frequency : 50/60 Hz Output voltage : 16 V For details, refer to the instruction manual of AC adapter.		
	Operating voltage range		11.5 V to 16.8 V		
	Power consumption		MAX 27 W		
	Dimensions		250 (W) x 160 (D) x 285 (H) mm		
	Weight		4.9 kg (with battery)		
	Still image recording	Resolution	NTSC: H640 x V480 (Pixel) PAL : H768 x V576 (Pixel)		
		Recording format	When stereo optical adapter is selected, files are stored as compressed JPEG format (Exif 2 compliant) high (HIGH) or uncompressed TIFF format (TIFF-YC). When other optical adapters are used, the compressed JPEG format (Exif 2 compliant) is selected automatically. With JPEG, the image quality can be selected from SHQ, high and standard.		
		Character superimpose	The date/time, title, note and OLYMPUS logo displayed on the screen can be superimposed on the image. If a stereo optical adapter is connected, superimposed and non-superimposed images are recorded.		
		Audio recording	Setting	Audio recording is possible according to the menu setup.	
			Recording format	WAV format.	
Setting			Max. 60 sec.Interruption possible during this period.		
Still image retrieval	Audio playback	When a moving image containing audio recording is played, the recorded audio is played simultaneously.			
	Restrictions	Images and audio recorded on IPLEX FX can be retrieved.			
		Images in a different TV format cannot be played even when they were recorded with the IPLEX FX.			

Base unit	Moving image recording	Resolution	QVGA NTSC: H320 x V240 (Pixel) PAL : H384 x V288 (Pixel) VGA NTSC: H640 x V480 (Pixel) PAL : H640 x V480 (Pixel)
		Recording format	AVI formats (Motion JPEG, Compression rate fixed). A movie can be appended at the end of the last recorded movie. Can be played on the Windows Media Player. (Provided that the Windows Media Player Ver.7 or later and Direct X7.1 or later are installed)
		Character superimpose	The date/time, title, note and OLYMPUS logo displayed on the screen can be superimposed on the image.
		Recording time	Depending on the recording card capacity and subject.
		Audio recording	Can be selected simultaneously with moving image recording.
		Restrictions	Moving image playback guaranteed only when one of the recommended recording cards or USB memory is used.
	Moving image playback	Audio playback	When a moving image containing audio recording is played, the recorded audio will be played simultaneously.
		Play/stop moving images	Every time the [MEAS/ENTER] joystick is pressed the moving image pauses or starts playing. Also, while an image is paused, each tilt of the [MEAS/ENTER] joystick skips as follows: skip 1 minute forward or backward by tilting up or down, and skip 1 second forward or backward by tilting right or left. From the first (last image), you can display the last (first) image by returning (advancing).
		Restrictions	Images recorded on IPLEX FX can be retrieved.
			Images in a different TV format cannot be played even when they were recorded with the IPLEX FX.
Moving image files that have been moved or copied to a USB memory from a recording card or internal memory cannot be played even if they were recorded using the IPLEX FX.			



Base unit	Thumbnail display		All images recorded on a recording card in the RECORDING CARD slot or in internal memory can be displayed as thumbnails. To display thumbnails, press the [VIEW] button on the control unit. Images stored on a USB memory, which has been recommended by Olympus, that is inserted in the USB connector can also be displayed.
	Retrieved image display		Images recorded to the various recording media can be retrieved and displayed. To retrieve images, display thumbnails and push the [MEAS/ENTER] joystick on the control unit.
	Comparison of two images	Display	The display screen can be divided into two screens on the left and right, and the live and retrieved images can be displayed simultaneously on them. This operation is available by displaying the menu from the control unit.
		Record	Press and hold the [FRZ/REC] button to record two images. (Live images that can be recorded are frozen images only.)
	Image file operations	Title input	Images can be titled with the menu operation on the control unit. Each title is composed of up to 30 letters and is accompanied by a 3-digit serial number.
		Delete	Images recorded on the various recording media can be deleted. Use the BRT UP lever to display multiple images.
		Copy	Images recorded on various recording media can be copied to different folders. Use the BRT UP lever to display multiple images.
		Move	Images recorded on various recording media can be moved to different folders. Use the BRT UP lever to display multiple images.
		Search	Images recorded on various recording media can be searched by date.
		Note input	You can record information in addition to measurement information. The information can be input by selecting one of the 10 data items from one of the 10 category items.
Folder operation		Folders can be added and deleted to and from various recording media.	

Base unit	Measurement function	Measurement types		<p>Stereo measurement: When a stereo optical adapter is used.</p> <p>Scaler measurement: When a stereo optical adapter is not used.</p> <p>Spot ranging: When a stereo optical adapter is used.</p>
		Measurement modes	Distance	Distance between two points indicated on the screen.
			Area/Lines	<ul style="list-style-type: none"> Total length of lines connecting multiple points (max. 20 points) indicated on the screen. Area of a closed figure formed by indicating multiple points. (Stereo measurement only)
			Point to line	Distance from a point to a line (reference line) that is defined by indicating two points on the screen. (Stereo measurement only)
			Depth	Distance from a point to a plane that is defined by indicating three points on the screen. (Stereo measurement only)
			Offset	A straight line (reference line) is defined by specifying two points on the screen, and while the distance from a third specified point to the straight line is calculated, the line parallel to the offset line is displayed. (Stereo measurement only)
			Multi	This type of measurement automatically detects and displays the material loss region between two specified points, and measurements the width, depth and area. (Stereo measurement only)
			Profile	This mode allows for displaying the surface profile obtained by sectioning the target object with a plane defined by the line connecting two specified points and the optical center axis on the left screen. (Stereo measurement only)
		Displaying the measurement results		<ul style="list-style-type: none"> Normally, displays measurement results for the measurement point indicated by the cursor. Up to 3 measurement results can be displayed. (Stereo measurement: distance, point to line, offset, and depth only)

Base unit	Measurement function	Spot ranging	<ul style="list-style-type: none"> Spot ranging indicates approximate value of the distance from the tip of the scope to the object on screen specified by cursor. The distance is indicated via numerical value and color-coded bar. (Stereo measurement: except for profile)
		Recording	<ul style="list-style-type: none"> It is possible to record up to 3 groups of measurement results on the measurement screen. When measurement results exist, pressing and holding the [FRZ/REC] button on the remote controller records the image together with the measurement results.
		Correction of the specified point	It is possible to select and correct specified points. (Stereo measurement only)
		Restrictions	<ul style="list-style-type: none"> The image format is TIFF or JPEG (HIGH) with the stereo measurement and JPEG with the scaler measurement. The object distance measurement result is not recorded. When a retrieved image is measured, stereo measurement is not available unless the same measurement environment used for to capture the image has been register for the measurement. The stereo optical adapter can be used by registering it as a new stereo adapter setup. Recommended measurement range for stereo measurement up to 15 mm Possible measurement range up to 30 mm Possible to record in a maximum of eight measurement environments.
	Volume	Volume adjustment of audio playback and beep according to menu operations.	
	Save settings	Sets whether the last or default settings are recalled the next time the system is started up.	
	Connected to a PC	USB cable connection. Contact Olympus for details.	

Chapter 10 Specifications

Carrying case	Equipment stored in carrying case	Insertion tube	Wind the insertion tube on the drum and store it in the storage bag.
		Control unit, Base unit	Stowed in storage space.
		Optical adapter	Placed in optical adapter case and then stowed in storage space of the top cover.
		Other items	<ul style="list-style-type: none"> • Shoulder strap x1 • Optical adapter case holder x1 • Battery x 2 • Battery charger (including power cables) x1 • AC adapter (including power cables) x1 • Instruction manual • Lens cleaning kit • Utility disc • Hook assembly x 2 (IV8635X1 only)
	Handles		Three positions.
	Extendible handle, wheels		Equipped with wheels and extendable handle for moving the case.
	Dimensions weight	Dimensions	624 (W) x 303 (D) x 491 (H) mm 24.56 (W) x 11.94 (D) x 19.31 (H) inch
Weight		Approximately 10 kg	

External Application Standard	EMC Information	<p>This product is applied with the requirements of standard IEC/EN61326-1 concerning electromagnetic compatibility.</p> <ul style="list-style-type: none"> • Emission Class A, applied to industrial environment requirements. • Immunity Applied to industrial environment requirements. <p>Some interference may occur if this product is used in domestic location.</p>
	FCC and IC Information	<p>This device complies with 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.</p> <p>This Class A digital apparatus complies with Canadian ICES-003.</p> <p>Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.</p>
	<p>WEEE Directive</p> 	<p>In accordance with European Directive 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.</p> <p>Refer to your local Olympus distributor for return and/or collection systems available in your country.</p>
	<p>Chinese RoHS Directive</p> 	<p>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."</p> <p>(Caution)</p> <p>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.</p>

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This software is based in part on the work of the Independent JPEG Group.

10.3 Optical adapter specifications

■ For scope unit 4-mm type

When the optical adapter is mounted on the scope.

		AT120D/ NF-IV84	AT120D/ FF-IV84	AT120S/ NF-IV84	AT120S/ FF-IV84	AT50D/ 50D-IV84	AT50S/ 50S-IV84
Product abbreviation		120DN V84	120DF V84	120SN V84	120SF V84	50/50D V84	50/50S V84
Character color		Red	Green	Red	Green	Blue	Blue
Optical system	Field of view	120°	120°	120°	120°	50°/50°	50°/50°
	Direction of view	Forward	Forward	Side	Side	Forward/ Forward	Side/Side
	Depth of field *1	4 to 190 mm	25 to ∞ mm	1 to 20 mm	6 to ∞ mm	5 to ∞ mm	4 to ∞ mm
Distal end	Outer diameter *2	φ 4.0 mm	φ 4.0 mm	φ 4.0 mm	φ 4.0 mm	φ 4.0 mm	φ 4.0 mm
	Rigid distal end length *3	19.7 mm	19.6 mm	22.2 mm	22.2 mm	25.0 mm	28.8 mm



NOTE

*1 Indicates the range within which the image can be viewed clearly.

*2 The adapter can be inserted into a φ 4.0 mm hole when it is mounted on the scope.

*3 Indicates the length of the rigid portion at the scope's distal end when mounted.

■ For scope unit 6-mm type

When the optical adapter is mounted on the scope.

		AT40D-IV86	AT80D/ NF-IV86	AT80D/ FF-IV86	AT120D/ NF-IV86	AT120D/ FF-IV86
Product abbreviation		40D V86	80DN V86	80DF V86	120DN V86	120DF V86
Character color		Black	Red	Green	Red	Green
Optical system	Field of view	40°	80°	80°	120°	120°
	Direction of view	Forward	Forward	Forward	Forward	Forward
	Depth of field *1	200 to ∞ mm	8 to ∞ mm	35 to ∞ mm	4 to 190 mm	25 to ∞ mm
Distal end	Outer diameter *2	φ 6.0 mm	φ 6.0 mm	φ 6.0 mm	φ 6.0 mm	φ 6.0 mm
	Rigid distal end length *3	19.8 mm	19.8 mm	19.8 mm	19.8 mm	19.8 mm

		AT80S-IV86	AT120S/ NF-IV86	AT120S/ FF-IV86	AT60D/ 60D-IV86	AT60S/ 60S-IV86
Product abbreviation		80S V86	120SN V86	120SF V86	60/60D V86	60/60S V86
Character color		Black	Red	Green	Blue	Blue
Optical system	Field of view	80°	120°	120°	60°/60°	60°/60°
	Direction of view	Side	Side	Side	Forward/ Forward	Side/Side
	Depth of field *1	18 to ∞ mm	1 to 25 mm	5 to ∞ mm	5 to ∞ mm	4 to ∞ mm
Distal end	Outer diameter *2	φ 6.0 mm	φ 6.0 mm	φ 6.0 mm	φ 6.0 mm	φ 6.0 mm
	Rigid distal end length *3	25.2 mm	25.2 mm	25.2 mm	25.9 mm	32.2 mm



NOTE

*1 Indicates the range within which the image can be viewed clearly.

*2 The adapter can be inserted into a φ 6.0 mm hole when it is mounted on the scope.

*3 Indicates the length of the rigid portion at the scope's distal end when mounted.

■ For scope unit 6.2-mm type (IV8635X1)

When the optical adapter is mounted on the scope.

		AT120D/ NF-IV86X1	AT120D/ FF-IV86X1	AT80S- IV86X1	AT120S- IV86X1	AT60D/ 60D-IV86X1	AT60S/ 60S-IV86X1
Product abbreviation		120DN V86X1	120DF V86X1	80S V86X1	120S V86X1	60/60D V86X1	60/60S V86X1
Character color		Red	Green	Black	Black	Blue	Blue
Optical system	Field of view	120°	120°	80°	120°	60°/60°	60°/60°
	Direction of view	Forward	Forward	Side	Side	Forward/ Forward	Side/ Side
	Depth of field *1	4 to 190 mm	25 to ∞ mm	18 to ∞ mm	6 to ∞ mm	5 to ∞ mm	4 to ∞ mm
Distal end	Outer diameter *2	φ 6.2 mm	φ 6.2 mm	φ 6.2 mm	φ 6.2 mm	φ 6.2 mm	φ 6.2 mm
	Rigid distal end length *3	20.6 mm	20.5 mm	24.7 mm	24.7 mm	25.9 mm	32.9 mm



NOTE

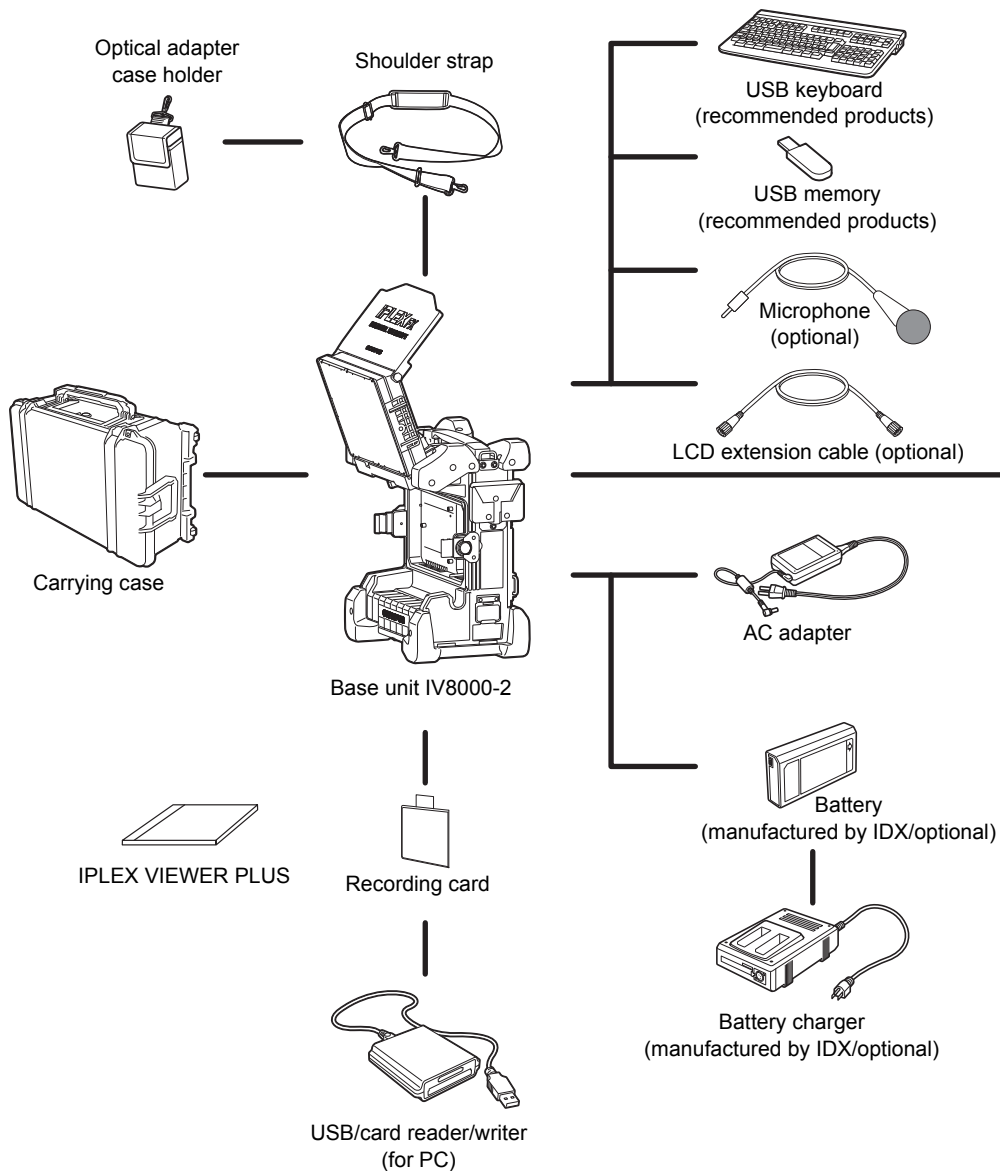
*1 Indicates the range within which the image can be viewed clearly.

*2 The adapter can be inserted into a φ 6.2 mm hole when it is mounted on the scope.

*3 Indicates the length of the rigid portion at the scope's distal end when mounted.

Appendix

System chart



Rigid sleeve (optional)

- MAJ-1737 (for IV84)
- MAJ-1253 (for IV86, IV86X1)

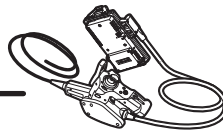


Optical adapter
(optional)



Scope unit 4-mm type

- IV8420
- IV8435

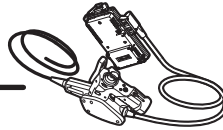


4-mm type

- AT120D/NF-IV84
- AT120D/FF-IV84
- AT120S/NF-IV84
- AT120S/FF-IV84
- AT50D/50D-IV84 (MAJ-1736D)
- AT50S/50S-IV84 (MAJ-1736S)

Scope unit 6-mm type

- IV8620
- IV8635
- IV8650
- IV8675

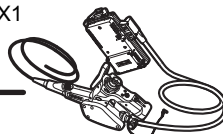


6-mm type

- AT40D-IV86
- AT80D/NF-IV86
- AT80D/FF-IV86
- AT120D/NF-IV86
- AT120D/FF-IV86
- AT80S-IV86
- AT120S/NF-IV86
- AT120S/FF-IV86
- AT60D/60D-IV86 (MAJ-1735D)
- AT60S/60S-IV86 (MAJ-1735S)

Scope unit 6.2-mm type

- IV8635X1



6.2-mm type

- AT120D/NF-IV86X1
- AT120D/FF-IV86X1
- AT80S-IV86X1
- AT120S-IV86X1
- AT60D/60D-IV86X1 (MAJ-1780D)
- AT60S/60S-IV86X1 (MAJ-1780S)

Hook assembly



Safety cap



Retrieval tool
(optional)



Scope case



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