



INSTRUCTIONS

INDUSTRIAL VIDEOSCOPE

IPLEX RX series

IPLEX RT series

IV9620RX

IV9635RX

IV9650RX

IV9675RX

IV9420RX

IV9435RX

IV9620RT

IV9635RT

IV9650RT

IV9675RT

IV9420RT

IV9435RT

OLYMPUS®

www.olympus.com

OLYMPUS CORPORATION

Shinjuku Monolith, 3-1 Nishi-Shinjuku 2-chome, Shinjuku-ku, Tokyo 163-0914, Japan
Telephone: +81 3 6901 4038

OLYMPUS EUROPA SE & CO. KG

Wendenstrasse 14-18, 20097 Hamburg, Germany
Telephone: (49)40-23-77-30

OLYMPUS SCIENTIFIC SOLUTIONS AMERICAS CORP.

48 Woerd Avenue, Waltham, MA 02453, U.S.A.
Telephone: +1 781 419 3900

OLYMPUS CORPORATION OF ASIA PACIFIC LIMITED

L43, Office Tower, Langham Place, 8 Argyle Street, Mongkok, Kowloon, Hong Kong
Telephone: +852 2481 7812

OLYMPUS AUSTRALIA PTY. LTD.

3 Acacia Place, Notting Hill VIC 3168, Australia
Telephone: +61 130 013 2992

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Introduction

Intended use

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

Instruction manual

This manual contains information about instrument operations and handling, which makes it possible for the instrument to be used safely.

Before using the instrument, carefully read the contents of this manual to ensure that you use the instrument correctly. After reading the manual, store it and the warranty agreement in a safe place. If you have any questions about any information in this manual, please contact Olympus.

Product configuration

For information about the configuration of devices required by this product and devices that can be used in combination with it, see "System chart" (P. 80) in the "Appendix".

Note that use of this product in combination with options and separately available items not only creates the risk of abnormal operation, it also can damage the product.

Expanded functions of the IPLEX RX/RT series

The IPLEX RX/RT series functions can be expanded.

- IPLEX RT → IPLEX RX
- IPLEX RX → IPLEX RX (Stereo measurement function)

Contact Olympus for details.

Important Information—Please Read Before Use

Marks used in this manual

The following signal words are used throughout this manual.



DANGER

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



WARNING

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



CAUTION

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

CAUTION

- Indicates a potential situation which, if not avoided, may result in failure of this instrument.

NOTE

- Indicates additional helpful information.

Safety precautions

General safety precautions

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



DANGER

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



WARNING

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

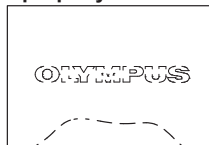


CAUTION

- Do not use this instrument in any environment (including strongly radioactive environments) that does not conform to the specified operating environment.
Otherwise, unexpected accidents that may damage the insertion tube may result.
- If you carry this instrument to the high altitude or use at the high altitude, be careful for followings.
 - Check the instrument prior to use.
 - Prevent the instrument from dropping.
 - Make sure of the safety thoroughly.
- Do not insert the insertion tube into an observation object in an environment that is outside the operating temperature range.
Continued use may damage or reduce the performance of the instrument.
- Do not touch the distal end immediately after using this instrument in high-temperature environments. Otherwise, you may get burned.
- Do not grip the control unit for long periods while using it in very hot environments. Doing so may lead to low-temperature burns. Wear gloves or do something to prevent low-temperature burns.
- Use only a power cord and AC adapter specified by Olympus and connect the power cord to a 3P power outlet in rated range.
Otherwise, smoke, fire, or electric shock might occur.
- Do not use the AC adapter outdoors.
Otherwise, electric shock might occur, or smoke emission and fire might occur, causing damage to the instrument.
The AC adapter is designed for indoor use.

- Do not subject the AC adapter to strong impact cause by striking it against a wall, dropping it, etc. Otherwise, malfunction, damage, or electric shock might occur.
- Should you sense any abnormality while inserting the scope into the object to be inspected, do not try to force the operation and carefully withdraw the insertion tube. Note the following precautions when withdrawing the insertion tube.
 - Do not try to withdraw from the observation object while angulation is locked or while the angulation section is bent.
 - If the insertion tube becomes caught on something during withdrawal, rotate the control unit gently while continuing the withdrawal.
- Note the following precautions during handling the insertion tube's distal end.
 - Do not drop the optical adapter or otherwise subject it to strong impact.
 - Do not subject the distal end to severe impact or pulling.
 - Do not expose the angulation section to severe impact or bending.
 Otherwise, glass lenses and the precision components that make up the distal end and the angulation section might be damaged.
- Never use the instrument without an optical adapter mounted. Otherwise, parts (screws, etc.) are easily subjected to deformation due to contact with hard objects, etc. Deformed insertion tube parts can make it no longer possible to mount an optical adapter and can cause the optical adapter to fall off.
- Never use an optical adapter when any of its parts are loose. Otherwise, a loose part might fall into the inspection object.
- The optical adapters have a safe double-screw installation design. However, if an optical adapter starts to come off the distal end while inserting the scope into the object to be inspected, the entire or a part of the observed image may be whitish caused by the illumination light or a part of the view field may be lacked. The optical adapter may fall off the insertion tube's distal end if used in this condition. In this case, immediately stop the inspection, carefully withdraw the insertion tube and secure the optical adapter as described in "Attaching the optical adapter" (P. 15).

Tip adapter not properly attached



(The strong light appears partially.)
The screen is viewed whitish.

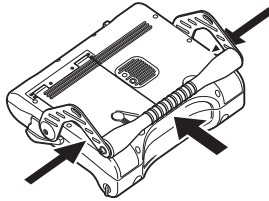
Correct



The entire screen is clearly viewed.

- Should you sense any abnormality when performing angulation operation, do not try to force the angulation operation. Doing so can damage the insertion tube or observation object.
- Never use the instrument while dirt or water is present in the optical adapter. Water tightness between the optical adapter and the distal end may be lost, or the optical adapter or the distal end may be damaged.
- If an optical adapter cannot be mounted or removed because the nut will not turn, stop using it. Contact Olympus.
- Do not look directly into the illumination being emitted by the distal end. Otherwise, eye damage may result.
- Take care not to have your feet caught by a cord including the power cord or universal cable.
- When hanging the main unit from your neck by the shoulder strap, do not allow it to catch on other objects. Be careful that it does not choke you.
- Do not allow metal or other foreign objects to enter the main unit through connectors or any other openings. Otherwise, a malfunction or electric shock may result.
- Do not use the parts other than the insertion tube in water or clean them under running water. Water creates the risk of electric shock. The parts other than the insertion tube are designed for water resistant proof construction only if the battery cover and connector caps are closed completely. Do not use or store the instrument under the environment where it is submerged or wet.

- Do not expose the LCD monitor to strong impact, strong pressure, or to scratching by a hard or pointed object.
Otherwise, the LCD monitor might be cracked or scratched, or a damaged monitor could create the risk of personal injury.
- Be careful to not pinch your hand or anything else when lowering the handle.



- Never connect any other USB device or USB cable to the USB connector except for the USB flash drive provided as standard or USB Flash Drive recommended by Olympus.
- Do not remove the battery or AC adapter while the system is running.
Otherwise, recorded data may be damaged.
- Do not remove the USB flash drive while recording or replaying the image.
Otherwise, recorded data may be damaged or lost.

CAUTION

- Do not continue to use the instrument when it is wet with condensation.
Sudden temperatures changes such as those that occur when entering a warm room from the outside cold can cause condensation to form inside the instrument. Using the instrument while it is wet with condensation can cause malfunction. If condensation forms, leave the instrument in the environment where it is to be used and allow the condensation to dry before using it.
- Do not cover the main unit with a plastic bag or other object during use.
If the inside of the instrument cannot be cooled, the instrument damage may result.
- Do not allow any liquids other than water, saltwater, machine oil, or diesel oil come into contact with the insertion tube.
Otherwise, the insertion tube may be damaged.
- Note the following precautions whenever handling the battery cover, video connector cap, and AC adapter connector cap.
 - Do not open or close covers/caps while your hands are wet.
 - Do not open or close covers/caps in an area subject to high humidity and/or dust.
 - Close covers/caps before storing the instrument and when they are not in use.
- Note the following precautions whenever removing the instrument from its carrying case.
 - Do not apply undue force when pulling the insertion tube from the slot in the cushion.
 - When removing the control unit or the main unit, do not lift it up by the universal cable or the insertion tube.
Otherwise, the instrument may be damaged.
- Note the following precautions whenever stowing the instrument in its carrying case.
 - Make sure that the insertion tube is not twisted before storing it.
 - Make sure the distal end has cooled before storing it.
 - Press down the [ANGLE LOCK] lever to release the angulation lock before storing it.
- Do not store the instrument in the following locations.
 - Environments subjected to high temperature, high humidity, and large amounts of dust or particulate
 - Locations exposed to direct sunlight or radiation
 - Locations subject to gas that includes halide^{*1}
Doing so could damage the equipment.

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

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

Battery precautions

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



DANGER

- Use the NC2040NO29 battery and the CH5000C or CH5000X battery charger.
- Do not allow connectors to become shorted.
- Do not attempt to apply solder directly to a terminal.
- Do not interconnect the electrodes of the battery with metal, or carry or store the battery together with metal objects.
- Do not connect the battery directly to a power outlet or the cigar lighter of an automobile.
- Do not immerse the battery in fresh or sea water, or allow the battery to get wet.
- Do not throw the battery into fire or subject it to heat.
- Do not attempt to open or modify the battery.
- Do not pierce the battery, hit it with a hammer, or step on it.
- Do not subject the battery to strong impact.
- Do not use or leave the battery where it is exposed to direct sunlight, in a closed automobile in the sun, near a heater, etc.
- Fluid leaking from the battery can cause loss of sight if it gets into your eyes. Flush your eyes with tap water or other clean water without rubbing. Contact a physician immediately.
- Do not use the battery charger outdoors.
Otherwise, electric shock might occur, or smoke emission and fire might occur, causing damage to the charger. The battery charger is designed for indoor use.



WARNING

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

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



CAUTION

- If you are experiencing problems loading the battery, do not try to force it in. Check the orientation of the battery and check the terminals for abnormalities. Trying to force the battery into the compartment may cause malfunction.
- If you are having problems removing the battery from the instrument, do not apply undue force. Contact Olympus.
- Contact the airlines in advance when you transport the battery by the aircraft.
- When replacing the battery, do not suddenly insert or remove it repeatedly. Doing so may prevent the power from turning on.

NOTE

- Be sure to recharge the battery before using it for the first time after purchase or after it has not been used for a long period.
 - In general, the battery performance drops as the ambient temperature drops. Note that the battery performance degraded due to low temperatures recovers when the temperature rises to a normal level.
 - Contamination of battery electrodes with sweat or oil will cause contact failures. When the battery is dirty, wipe it clean with a dry cloth before use.
 - Use the battery correctly. Otherwise, battery fluid leakage, overheating, or damage may result. Insert the batteries in the correct direction when replacing them.
 - A full charger will provide approximately 120 minutes (generally speaking) of continuous operation. Actual operating time depends on the charging method, the operating environment, and the instrument's settings. Preparation of multiple spare batteries is recommended when long hours of battery-powered operation are expected. The battery charging time is normally about two hours and 30 minutes (generally speaking).
 - Recommended temperature range for Li-ion battery operation.
 - Discharging (using main unit): -10 °C to 40 °C
 - Charging : 0 °C to 45 °C
 - Storage : -20 °C to 60 °C
- Using the battery under a temperature outside the above temperature ranges will result in degradation of its performance and service life. When storing the battery, be sure to remove it from the main unit.
- The battery is a consumable item.
 - When disposing of a battery, be sure to do so in accordance with all local laws, rules, and regulations. Before disposing of a battery, check your local laws, rules, and regulations and follow them accordingly.
 - The battery cannot be charged using the instrument. For information on charging the battery, refer to the manual that came with the battery charger.
-

Rating plate/caution plate

The safety ratings, cautions, and serial number are on stickers on parts of the main unit and the control unit.

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

Main unit

■ Caution

⚠ CAUTION

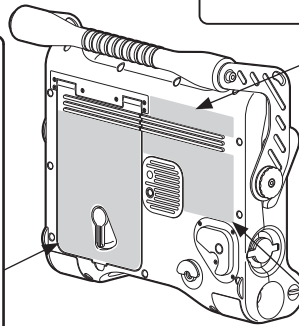
- READ THE INSTRUCTION MANUAL THOROUGHLY BEFORE USE.
- FOR THE OPERATING ENVIRONMENT, BE SURE TO OBSERVE THE WARNINGS AND CAUTIONS GIVEN IN THE INSTRUCTION MANUAL.
- NEVER OPERATE THE UNIT IN THE PRESENCE OF INFLAMMABLE GASES.
- NEVER USE BATTERY AND AC ADAPTER EXCEPT THAT DESIGNATED BY OLYMPUS.
- ALL REPAIRS SHOULD BE MADE BY AUTHORIZED OLYMPUS SERVICE PERSONNEL ONLY.
- RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTION.

⚠ 注意

- 取扱説明書を熟読の上、ご使用ください。
- 使用環境につきましては、取扱説明書に記載されている注意事項を守ってご使用ください。
- 可燃性雰囲気中では、使用しないでください。
- 当社指定以外のバッテリー及びACアダプターは、使用しないでください。
- 当社指定の修理員以外の修理は絶対に行わないでください。
- 不適切なタイプの電池に交換すると爆発の危険があります。使用済のバッテリーは、取扱説明書に従って処理してください。

■ Model name, serial number

| | | |
|-----------------------|----------|---------|
| INDUSTRIAL VIDEOSCOPE | Serial# | Y800000 |
| MODEL | IV9620RX | |
| | 13.10 | |



■ Rating

OLYMPUS CORPORATION
TOKYO 163-0914, JAPAN MADE IN JAPAN

INPUT
AC Adapter 12V \approx 15W
Battery 10.8V \approx 15W

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.

CE

Control unit

■ Caution

■ Caution (both sides)

■ Caution (both sides)

1 Unpacking

1.1 Unpacking the instrument

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

| Name | Count |
|---|-------|
| IPLEX RX or RT (main unit) * | 1 |
| USB flash drive for recording images | 1 |
| AC adapter | 1 |
| AC power cord | 1 |
| VGA conversion cable | 1 |
| Optical adapter case | 1 |
| Shoulder strap | 1 |
| Optical adapter case holder | 1 |
| Lens cleaning kit (cotton swab, brush) | 1 |
| Tip cap (either for 4-mm or for 6-mm) | 1 |
| Stopper | 1 |

| Name | Count | |
|---|---------------------------------------|---|
| Insertion tube fastening belt | 1 | |
| LCD protection sheet (Stuck to the LCD monitor) | 1 | |
| Instructions | IPLEX RX/RT series (this document) | 1 |
| | LCD protective sheet | 1 |
| Return Request Card (For Japan only) | 1 | |
| Warranty Registration Card (For Japan only) | 1 | |
| Carrying case | 1 | |

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

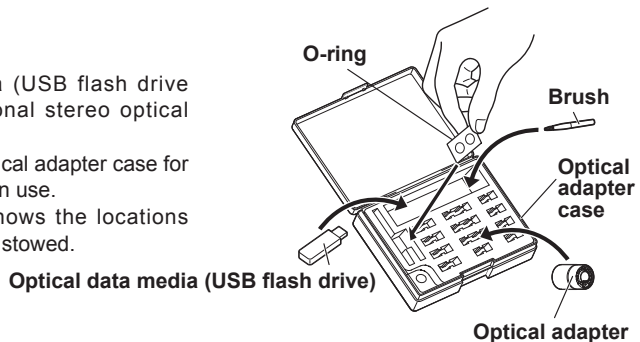
■ Optical adapter case

The following items are stowed in the optical adapter case.

- Optical adapter
- O-ring
- Optical data media (USB flash drive provided with optional stereo optical adapter)

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

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

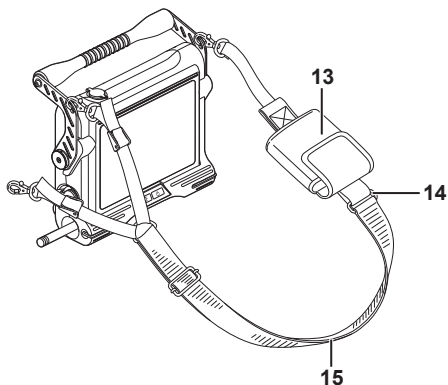
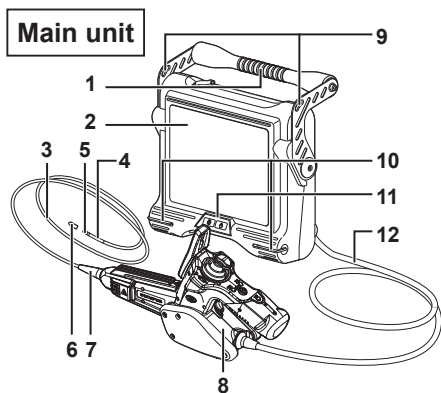


About options

Refer to "System chart" (P. 80) for information on options.

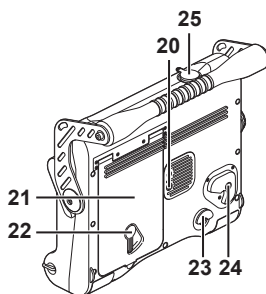
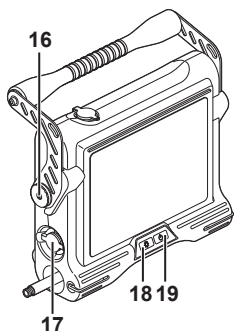
2 Nomenclature

2.1 Main unit/control unit nomenclature

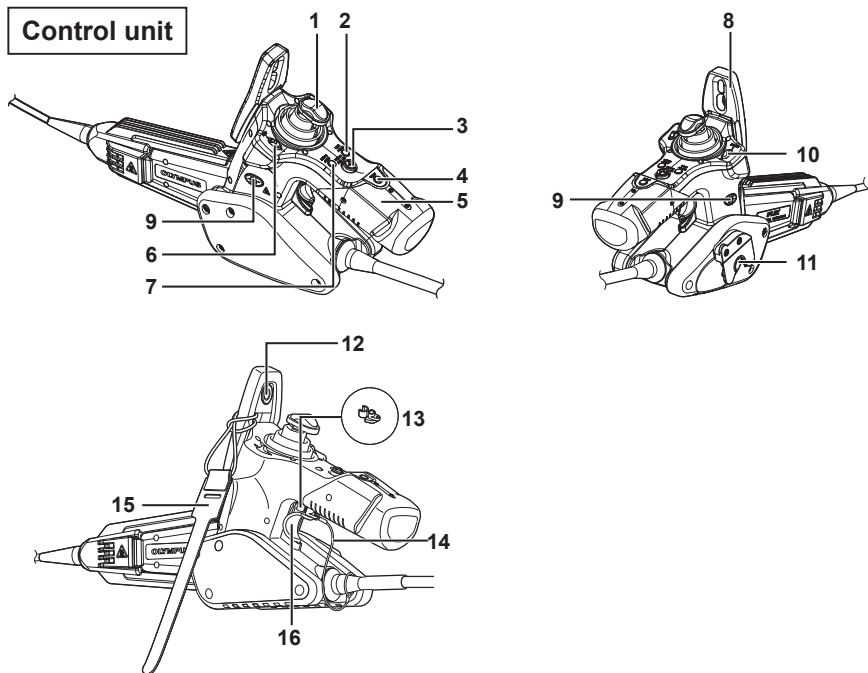


| No. | Name |
|-----|--|
| 1 | Handle |
| 2 | LCD monitor (covered by LCD protective sheet) |
| 3 | Insertion tube (or scope) |
| 4 | Angulation section |
| 5 | Distal end |
| 6 | Tip cap |
| 7 | Bend stopper |

| No. | Name |
|-----|-----------------------------|
| 8 | Control unit |
| 9 | Strap holder |
| 10 | Strap bracket |
| 11 | Front panel |
| 12 | Universal cable |
| 13 | Optical adapter case holder |
| 14 | Ring |
| 15 | Shoulder strap |



| No. | Name |
|-----|--------------------------|
| 16 | Control unit holder |
| 17 | AC adapter connector cap |
| 18 | LIGHT button (☀) |
| 19 | POWER button (⏻) |
| 20 | Tripod screw hole |
| 21 | Battery cover |
| 22 | Lock release lever |
| 23 | Scope handset holder |
| 24 | Lock release button |
| 25 | Video connector cap |



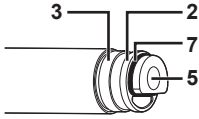
| No. | Name | No. | Name |
|-----|--|-----|---|
| 1 | [ANGLE] joystick (Angulation operation) | 9 | [FRZ/REC] button * (Freeze/record observed image (two locations; left and right)) |
| 2 | [LIVE/GAIN] button (Live image display/gain (RX only)) | 10 | [ZOOM] lever (Zooming the image) |
| 3 | [MEAS/ENTER] joystick (Folder selection/Menu selection/ measurement operations (RX (Stereo measurement function) only)) | 11 | Hanger (To hang the control unit on the main unit) |
| 4 | [VIEW] button * (Retrieve screen display/ thumbnail screen display) | 12 | Insertion tube holder |
| 5 | Grip | 13 | Stopper (To prevent accidental operation of the angulation lock) |
| 6 | [BRT] lever (Adjusting the brightness) | 14 | Strap |
| 7 | [MENU/EXIT] button (Menu display) | 15 | Insertion tube wrap belt |
| 8 | Joystick guard | 16 | [ANGLE LOCK] lever (To lock the angulation operation) |

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

2.2 Distal end/optical adapter nomenclature

4-mm type

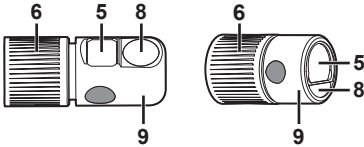
- Distal end



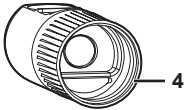
- Optical adapter

Side view

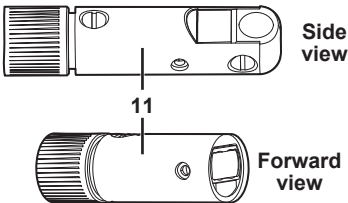
Forward view



- Optical adapter internal view

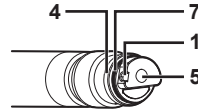


- Stereo optical adapter



6-mm type

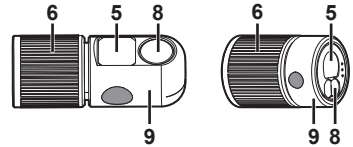
- Distal end



- Optical adapter

Side view

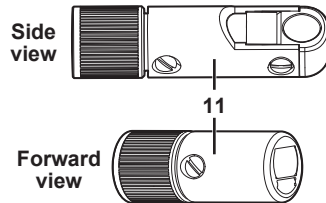
Forward view



- Optical adapter internal view



- Stereo optical adapter

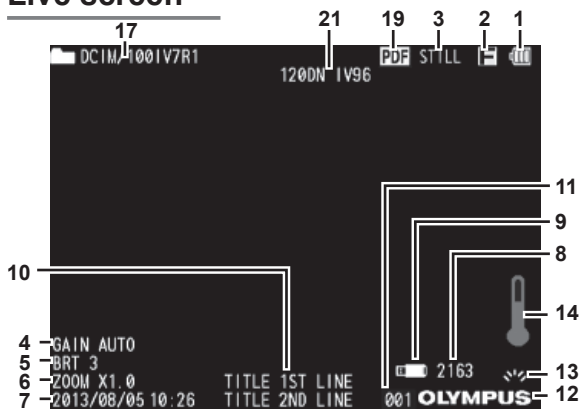


| No. | Name | No. | Name |
|-----|---|-----|---|
| 1 | Optical adapter positioning cut surface | 7 | O-ring |
| 2 | First screw thread | 8 | Illumination |
| 3 | Second screw thread | 9 | Product abbreviation * |
| 4 | Connecting screw thread | 10 | Positioning pin |
| 5 | Objective lens | 11 | Product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

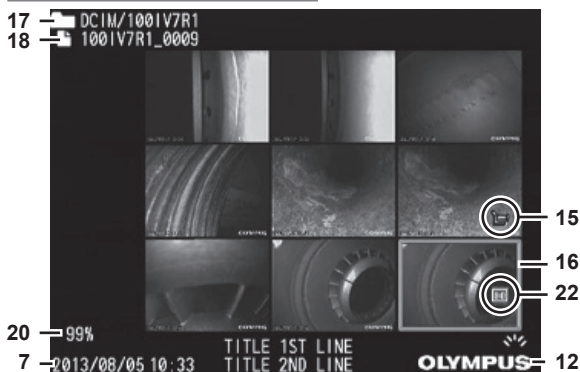
* For information about the product abbreviation, see "9.3 Optical adapter specifications" (P. 79).

2.3 LCD monitor nomenclature

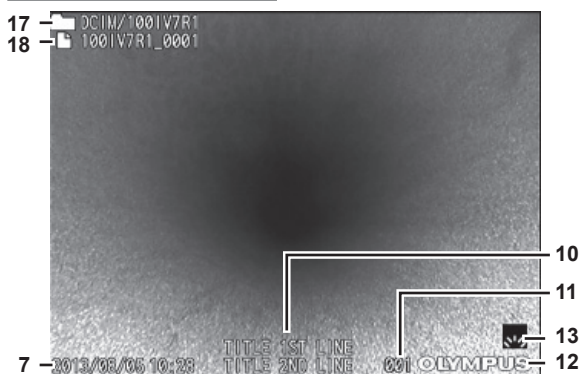
Live screen



Thumbnail screen



Retrieve screen



| No. | Name |
|-----|---|
| 1 | Battery indicator |
| 2 | Freeze indicator |
| 3 | Recording/playback indicator |
| 4 | Gain mode (RX only) |
| 5 | Brightness level |
| 6 | Zoom level |
| 7 | Date/Time |
| 8 | Number of images that can be recorded |
| 9 | USB flash drive indicator |
| 10 | Title |
| 11 | Sequence number |
| 12 | Logo |
| 13 | Light indicator |
| 14 | Temperature indicator (RX only) |
| 15 | Movie image indicator |
| 16 | Thumbnail selection frame |
| 17 | Folder name |
| 18 | File name |
| 19 | PDF indicator (RX only) |
| 20 | Remaining media capacity |
| 21 | Adapter name (RX only) |
| 22 | Measurement indicator (RX (stereo measurement function) only) |

NOTE

- The displayed title is the title that was entered on the Live screen the last time the system was used.
- Should you notice any dirt, stains, or other abnormalities on the LCD monitor, see "7 Storage and maintenance" (P. 68).

3 Pre-observation/pre-operation preparation and inspection

Be sure to finish the preparation and inspection work described in this chapter before using the instrument. At the first sign of any abnormality, immediately stop using the instrument and perform the required actions as described in "8 Troubleshooting" (P. 71).

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

CAUTION

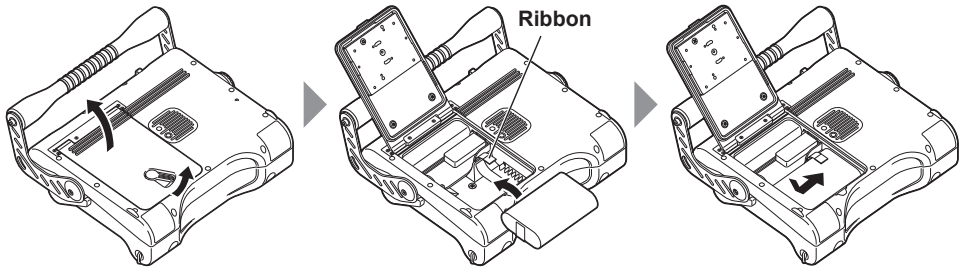
- Make sure the instrument is turned off before performing pre-observation and pre-operation preparation and inspection.

3.1 Pre-observation preparation

- 1 Preparing the power supply.
When using the battery (See P. 13)
When using the AC adapter (See P. 14)

Preparing the power supply

■ Using the battery



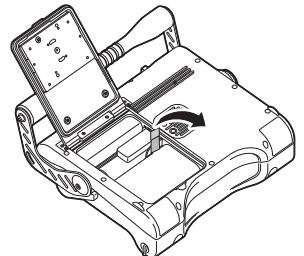
Slide the lock release lever to the side to open the battery cover.

Noting the orientation of the battery, insert it terminals first from above the ribbon.

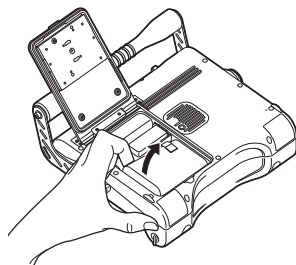
After inserting the battery correctly, close the cover and slide the lock release lever back into the lock position.

● Removing the battery

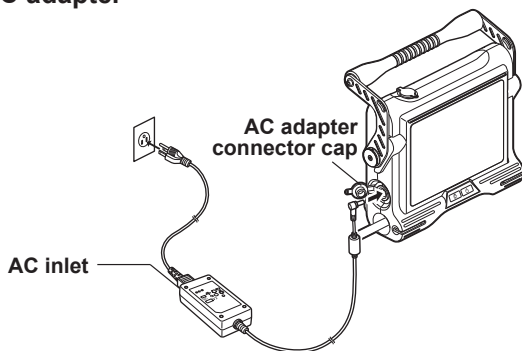
The battery can be removed by pulling the ribbon towards you.



If you find it difficult to remove the battery, hook your finger directly onto the battery to remove it.



■ Using the AC adapter



Open the AC adapter connector cap.

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

3.2 Pre-operation preparation

- 1** Attach the optical adapter. (See P. 15)
- 2** Turn on power. (See P. 16)
- 3** Select the optical adapter. (See P. 16)
- 4** Check the remaining battery level. (See P. 17)
- 5** Select the display language (initial settings). (See P. 47)
- 6** Configure date and time settings (initial settings). (See P. 47)
- 7** Check the illumination of the distal end. (See P. 18)
- 8** Adjust white balance. (See P. 41)
- 9** Check the angulation operation of the insertion tube. (See P. 18)
- 10** Conduct a pre-operation inspection. (See P. 25)

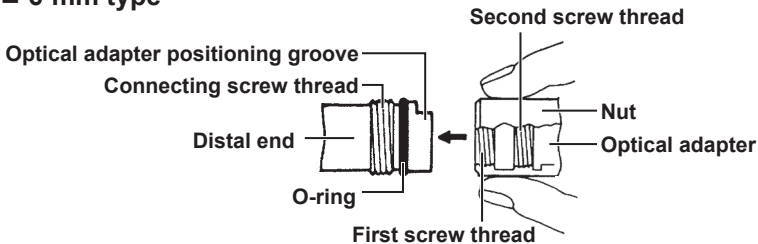
Attaching the optical adapter

CAUTION

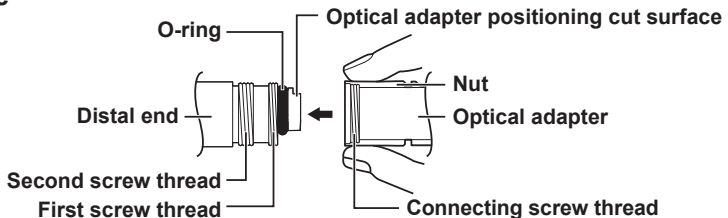
- Be sure to attach the O-ring to the insertion tube's distal end before using the optical adapter. Water getting into the area where the insertion tube and optical adapter join might cause malfunction or damage. Also note that an optical adapter by itself is not watertight.
- If an optical adapter cannot be mounted or removed because the nut will not turn, stop using it. Contact Olympus.
- Never use the instrument while dirt or water is present in the optical adapter
Water tightness between the optical adapter and the distal end may be lost, or the optical adapter or the distal end may be damaged.

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

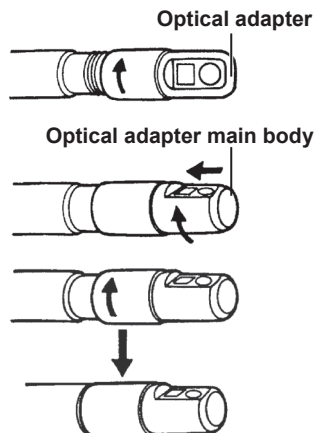
■ 6-mm type



■ 4-mm type



- 2 Turn the optical adapter nut clockwise until the first screw thread passes over the connecting screw thread.
- 3 Once past the first screw thread, turn the entire main body of the optical adapter clockwise while pushing gently until it fits into the positioning cut surface on the insertion tube'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 stops.



■ Removing the optical adapter

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

Turning on power

Hold down the main unit's power button (⏻) until a short beep is generated to turn on power.

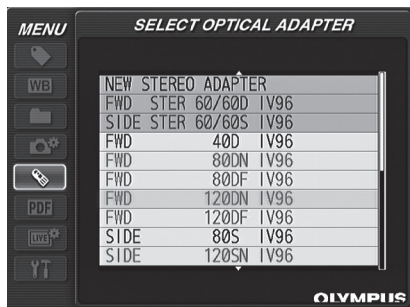
Display screen and menu operations become enabled about 10 seconds after the power button (⏻) is pressed.

■ Turning off power

Hold down the main unit's power button (⏻) for at least two seconds.

Selecting the optical adapter

When the power is turned on, a list of the optical adapters is displayed.








Select the optical adapter to use, and press the [MEAS/ENTER] joystick.

NOTE

- If the optical adapter is replaced during observation, select the optical adapter again in [Menu Operation]. See "5.1 Performing menu operations" (P. 40) and "5.2 Using the live screen/freeze screen" (P. 41).
- When using the stereo optical adapter, see "6.3 Registering the new stereo optical adapter or re-registering the stereo optical adapter" (P. 54)
- When using AT100S/NF-IV94 or AT100S/FF-IV94, selecting 100SN or 100SF from the optical adapter list enables to display the erect image.

Checking the remaining battery level

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

| Indicator | Battery condition |
|--|--|
|  | Remaining battery power about 50% or more. |
|  | Remaining battery power about 25% to 50%. |
|  | Remaining battery power about 5% to 25%. |
|  * ¹ | Remaining battery power about 2% to 5%. |
|  * ² | Remaining battery power about 1% to 2%. Charge the battery, replace with a charged battery or connect the AC adapter. |

*1 Do not record or delete images, and do not format the USB flash drive. If power runs out during these operations, data could be corrupted.

*2 Should the battery indicator start to flash, immediately turn off power or connect the AC adapter. Continued use of the instrument will result in it shutting down, which could destroy recorded data.

NOTE

- 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 from that shown on the [POWER INDICATOR].) For details, refer to the instruction manual of your battery charger.

Checking lighting of illumination at the insertion tube's distal end

NOTE

- Always turn the LIGHT button (☀️) on the front panel of the main unit OFF when the instrument is not in use, such as when replacing the optical adapter, etc.
-

Turning ON the power will light the illumination automatically.
The light intensity is adjusted depending on the brightness of the observation object.
The light indicator at the bottom right of the LCD monitor also is displayed.

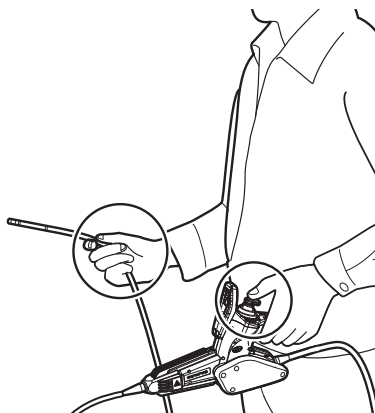
■ To turn OFF the illumination

Press the LIGHT button (☀️) on the front panel.

Checking the angulation operation of the insertion tube

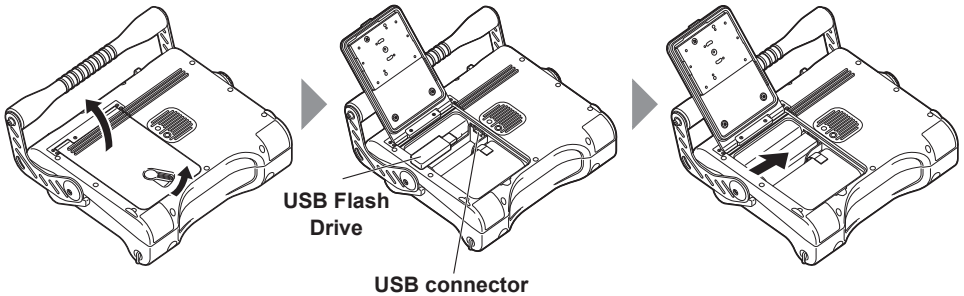
Extend the insertion tube straight out and operate the [ANGLE] joystick to check for smooth angulation section operation.

Angulation movement matches the angle and direction of [ANGLE] joystick movement.



Attaching the USB flash drive

■ Inserting the USB flash drive

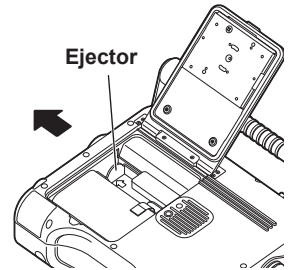


Slide the lock release lever to the side to open the battery cover.

Noting the orientation of the USB flash drive, insert it terminals first. After inserting the USB flash drive, close the cover and slide the lock release lever back to the lock position.

● Removing the USB flash drive

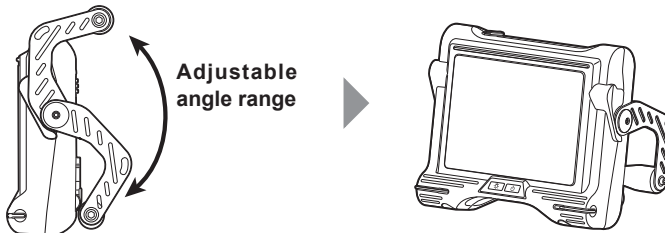
The USB flash drive can be removed by moving the ejector in the direction of the arrow as shown in the figure on the right.



Setting up the main unit and performing observation

Observation can be done with the main unit set up on a flat surface, hung from something, or on a tripod.

● Set up the main unit on a flat surface

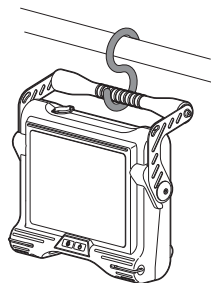


When installing the main unit on a flat surface for observation, use the handle as a stand.

Adjust the handle to an angle that allows the LCD monitor to be easily viewed. The angle of the handle can be adjusted smoothly to any position within the range shown in the figure above.

- **Hang the main unit**

When hanging the main unit to do observation, hook an S-hook, string or other item onto the handle.

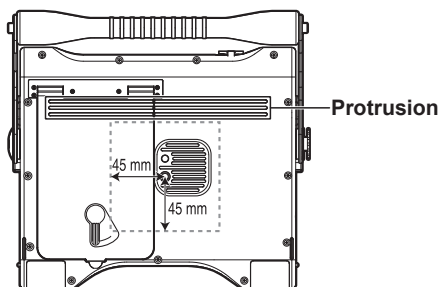


- **Set up the main unit on a tripod**

Attach the tripod platform to the main unit to use a tripod to do observations.

NOTE

- When fixing the main unit to the tripod, mount it so the tripod platform does not run up on the protrusion on the rear of the main unit. Fixing the tripod with the platform installed at an angle may cause the main unit to fall off. You can use a square platform that measures 45 mm or less from the center of the tripod screw.

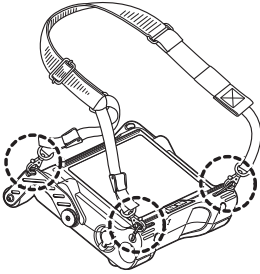


Attaching the shoulder strap

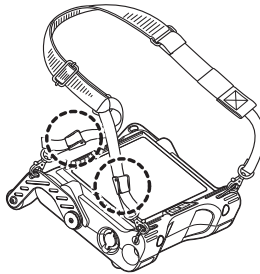
The shoulder strap lets you attach the main unit to your body to do observations or to carry it around easily from your shoulder.

■ Attach the main unit to your body

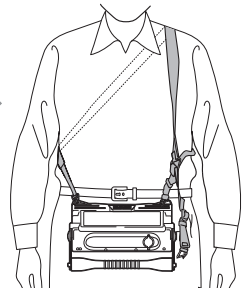
1



2



3



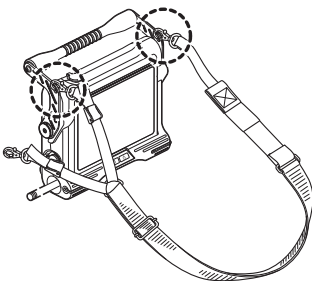
1 Attach the shoulder strap hooks to the two belt brackets and one of the two belt holders.

2 Adjust the length of the shoulder strap by the length adjuster buckle, and adjust the screen to an easy-to-view angle.

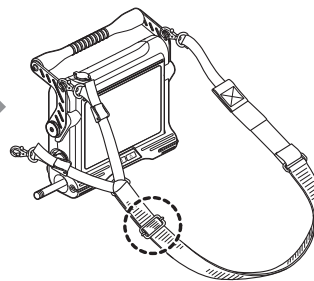
3 Hang the shoulder strap on your shoulder and do observations.

■ Hang the main unit from your shoulder

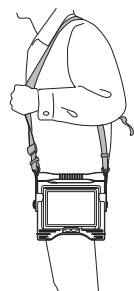
1



2



3



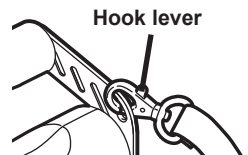
1 Attach the shoulder strap hooks to the two belt brackets.

2 Adjust the length of the shoulder strap by the length adjuster buckle.

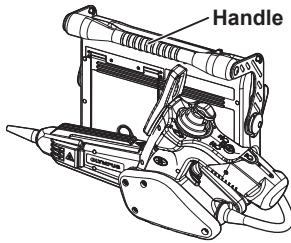
3 Hang the shoulder strap on your shoulder.

● Detaching the shoulder strap

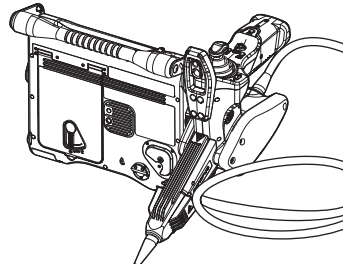
To detach the shoulder strap, press the hook lever to remove the hook from the main unit.



Mounting of the control unit on the main unit

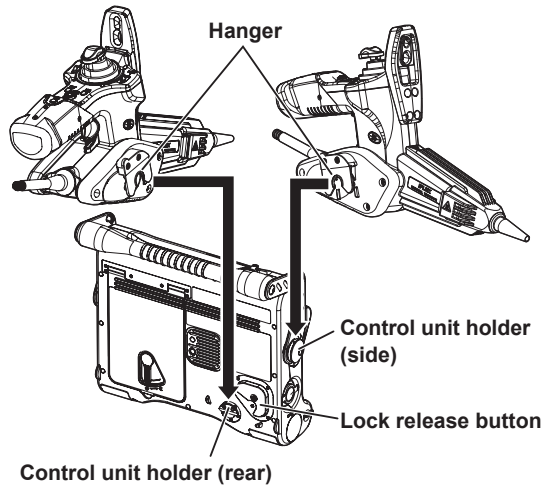


Back attachment: For transport



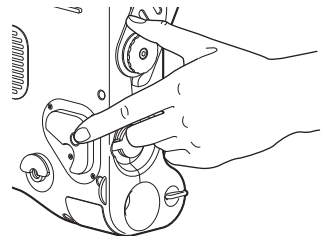
Side attachment: For observation

- 1** Insert the hanger on the side of the control unit straight into the control unit holder on the side or the back of the main unit.
- 2** Push in the hanger until you feel a click.



■ Detaching the control unit

Pull the control unit straight upward from the main unit. When the control unit is affixed to the back of the main unit, hold down the center of the lock release button as you pull upwards.

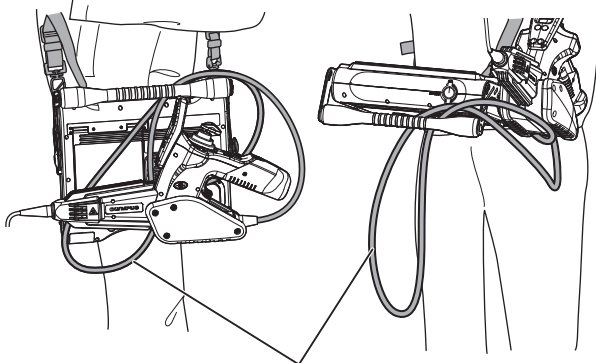


CAUTION

- When putting down the main unit while the control unit is attached to it, always place it on its side or base.
- Do not use excessive force or twist the control unit when it is attached to the main unit.

- **Walking with the control unit attached to the main unit (back, left side)**

Insert the slack of the universal cable between the handle and the main unit.



Universal cable

CAUTION

- When carrying the control unit fixed to the main unit, be careful for followings.
 - Hold the handle of the main unit
 - Take care not tot tilt or swing the main unit

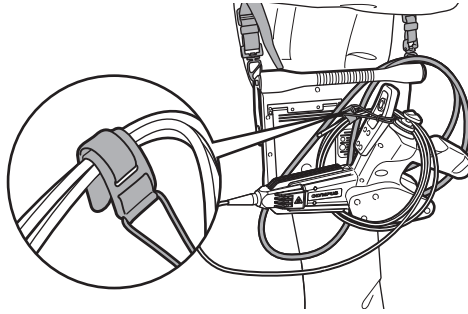
This instrument may be damaged.

Securing the insertion tube to move the instrument to another location

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

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

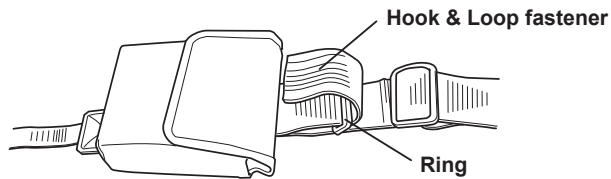
Transport the instrument by holding the main unit or by hanging it from the strap.



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

Attaching the optical adapter case holder

- 1** Pass the Hook & Loop fastener of the optical adapter case holder through the ring on the shoulder strap.
- 2** Fold the Hook & Loop fastener over to fasten it as shown in the diagram.



■ Removing the optical adapter case holder

Pull apart the Hook & Loop fastener and remove it from the ring.

3.3 Pre-operation/post-operation inspections

CAUTION

- When inspecting the insertion tube, be sure to hold it at a point behind the angulation section. Otherwise, the angulation section may be damaged.
- Also be sure to check the inspection items after using the instrument.

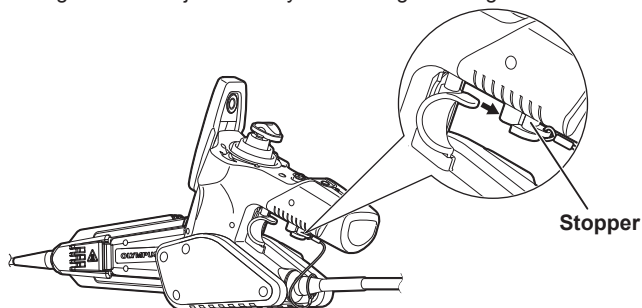
| Inspection location | Item | If abnormality is discovered |
|---|--|---|
| Overall | <input type="checkbox"/> Any dirt, sand, or other foreign matter on the control unit, insertion tube, battery cover, video connector cap, AC adapter connector cap? | See "7 Storage and maintenance" (P. 68). |
| | <input type="checkbox"/> Any cracks, scratches, or other defects to the control unit, insertion tube, battery cover, video connector cap, AC adapter connector cap? | Replacement required. Contact Olympus. |
| | <input type="checkbox"/> Any irregularities such as damage to or deformation of the exterior material, buttons, joysticks, or levers? | |
| | <input type="checkbox"/> Irregularities such as cuts or kinks in the universal cable? | |
| Insertion tube, angulation section, distal end | <input type="checkbox"/> Any looseness in materials other than the angulation section? | Replacement required. Contact Olympus. |
| | <input type="checkbox"/> Any dirt or water droplets on the objective lens of the distal end? Continued use in this condition creates the risk of damage to the optical adapter and/or distal end. | See "7 Storage and maintenance" (P. 68). |
| | <input type="checkbox"/> Any build up of dirt on the optical adapter positioning surface or threads of the distal end? | |
| | <input type="checkbox"/> Any distal end deformation or looseness, or unusual connecting screw wear? Never use the instrument while there is any looseness on the distal end. Doing so creates the risk of loose parts falling into the inspection object. | |
| O-ring | <input type="checkbox"/> Is the O-ring missing, broken, etc.? An O-ring that is misaligned or broken can allow water or other liquid to get into the joint between the distal end and optical adapter, creating the risk of malfunction and damage. | |

| Inspection location | Item | If abnormality is discovered |
|--|---|--|
| Optical adapter, stereo optical adapter | <input type="checkbox"/> Any dirt or water on the surface of the optical adapter and/or the objective lens in the optical adapter? Continued use in this condition creates the risk of damage to the optical adapter and/or distal end. | See "7 Storage and maintenance" (P. 68). |
| | <input type="checkbox"/> Make sure there are no deformities or foreign objects in the threads of the screws of the optical adapter. Note that insufficient cleaning can result in a loss of water tightness between the optical adapter and the distal end. | |
| | <input type="checkbox"/> Any looseness in optical adapter components? Never use the optical adapter if any components are loose. Otherwise, a loose part might fall into the inspection object. | |
| Stereo optical adapter | <input type="checkbox"/> Check measurement values in following cases. (RX (stereo measurement function) only) <ul style="list-style-type: none"> • When the stereo optical adapter is registered • Before and after measurement | See "6.5 Checking measurement values" (P. 58). |
| | <input type="checkbox"/> Check the serial number on the optical adapter selection screen when the stereo optical adapter is attached to the main unit. (RX (stereo measurement function) only) | See "6 Stereo measurement procedures (RX (stereo measurement function) only)" (P. 51). |
| LCD monitor | <input type="checkbox"/> Any surface cracks or other abnormalities? NOTE _____ <ul style="list-style-type: none"> • The LCD monitor is manufactured based on precision technologies. The LCD monitor may contain pixels that do not light (visible as black dots) or light permanently (visible as bright dots). This does not indicate a defect or malfunction of the product. _____ | Replacement required. Contact Olympus. |
| | <input type="checkbox"/> Any fingerprints on the screen or other soiling? | |
| Carrying case | <input type="checkbox"/> Any damage, looseness or other irregularities on the exterior, handle, latch, or other parts of the carrying case? | See "7 Storage and maintenance" (P. 68). |
| | <input type="checkbox"/> Specialized carrying case used? Use of a non-designated carrying case creates the risk of the insertion tube or main unit becoming damaged or malfunctioning. | Contact Olympus. |

4 Basic operation

4.1 Viewing an observation object

- 1 Turn on the illumination.**
- 2 While watching the display screen, insert the insertion tube into the observation object.**
Insert carefully while checking the insertion direction.
- 3 Use the [ANGLE] joystick to perform angulation operations and observe the applicable locations on the display.**
Be careful not to apply excessive pushing force, twisting or tension to the insertion tube.
- 4 Lock the angulation section angle and direction (angulation lock) and perform observation.**
When the angulation section is at the desired angle and direction, remove the stopper and raise the [ANGLE LOCK] lever.
The angulation angle can be adjusted finely even though the angulation is locked.



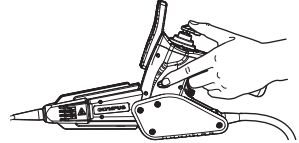
- 5 While watching the display screen, carefully withdraw the insertion tube.**
If the angulation is locked, press down the [ANGLE LOCK] lever first, and unlock the angulation before removing the insertion tube. Then, attach the stopper.

CAUTION

- Should the following message appears while inspecting with RX, immediately stop observation, carefully withdraw the insertion tube, and perform the required action as instructed in "Error messages" (P. 71).
 - HIGH TEMPERATURE (DISTAL END). PLEASE IMMEDIATELY PULL OUT THE INSERTION TUBE.
- Do not bend the insertion tube to a radius that is less than its minimum bend radius (20 mm for the 4 mm type, 30 mm for the 6 mm type) whenever operating the angulation section.

NOTE

- In general, the [ANGLE] joystick of the control unit is manipulated with the thumb of the hand holding the grip of the control unit.
- Other buttons are also to be manipulated with the fingers of the hand holding the grip of the control unit.
- Hold the insertion tube with the other hand to which the control unit is being held.
- Increasing the insertion tube looping amount (bending amount) decreases the maximum angulation angle limit of the angulation section. Keep the insertion tube as straight as possible to get the best operations from the instrument.
- Angulation tends to be difficult to achieve under low temperatures.
- The image noise may be extreme under high ambient temperatures.
- In case of RX, a yellow temperature indicator is displayed when ambient temperature is about 80 °C to warn you that it is approaching the upper limit.
Note that this indicates that the upper limit of the ambient operating temperature is being approached.



4.2 Adjusting the image display

Still image display (Freeze)

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

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

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

NOTE

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

Enlarging an image (Zoom)

The display image can be zoomed for an enlarged view of the observation object. Pressing the [ZOOM] lever toward [T] will enlarge the image up to five times. To zoom back to the original image size, press the [ZOOM] lever toward [W].

NOTE

- Images are zoomed using "digital zoom ". As a result, the image may become slightly coarse at higher zoom factors.
- When using the stereo optical adapter with RX, there are some restrictions in operations. For details, refer to "Observing measurement area" (P. 60) and "Measuring the distance to the measurement area by spot ranging" (P. 61).

Adjusting image brightness

■ GAIN mode switching (RX only)

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.

| Mode | Description |
|--------|---|
| 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 "AUTO" 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" is required. "WiDER2" further expands the dynamic range so that dark positions can be observed. But the noise may increase under certain observation conditions. |

■ Brightness adjustment with the [BRT] lever

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

While a live image is displayed, press the [BRT] lever on the control unit toward [▲] to brighten the overall image or toward [▼] to darken it.

● Displaying a high-sensitivity image (monochrome boost)

The live image becomes monochrome (monochrome boost) during high-sensitivity image display. This function is effective to a higher level of brightness than normal when viewing a very dark subject, etc. While a live image is displayed, you can switch to high-sensitivity image display by pressing the [BRT] lever towards [▲] until [BRT] (brightness) reaches its maximum setting (Level 10). Note that the image noise may increase under certain observation conditions.

NOTE

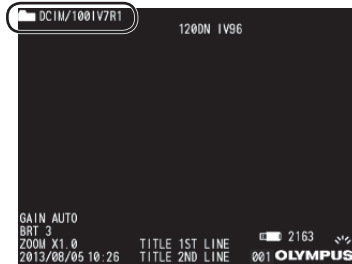
- When using the stereo optical adapter with RX, there are some restrictions in operations. For details, refer to "Observing measurement area" (P. 60) and "Measuring the distance to the measurement area by spot ranging" (P. 61).

4.3 Switching the folder from the live screen

In the live screen, you can use the [MEAS/ENTER] joystick to switch the folder in which you are recording or playing back an image.

1 While a live image is displayed, move the [MEAS/ENTER] joystick left, right, up, and down.

The folder name shown in the upper left area of the screen changes.



The folder that is displayed, is the folder for the image being recorded or played back.

NOTE

- The folder configuration which can be switched with the [MEAS/ENTER] joystick is up to the second layer.

4.4 Recording images

Still images and movie images can be recorded during observation. Data can be stored on the provided USB flash drive for recording images.

Use the provided USB flash drive or a recommended USB flash drive.

Check to make sure that the USB flash drive is correctly loaded before using it.

Image recording preparation

Format the USB flash drive for recording images on the instrument before using it. For details about formatting, refer to "USB flash drive formatting (initialization)" (P. 48).

The following table shows the size of a single image and the approximate numbers of images that can be recorded on a USB flash drive.

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

Image recording settings must be configured using menu operations. See "5.1 Performing menu operations" (P. 40) and "5.2 Using the live screen/freeze screen" (P. 41).

■ Specifying the image recording format

To record the date, time, title, logo, measurement results, and other on-screen information onto the image being recorded, press the [MENU/EXIT] button while a live screen is displayed.

On the menu that appears, select [RECORD] - [PRINT SCREEN ON/OFF] and set "ON" (See P. 42).

NOTE

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

■ File marks

Setting "ON" in the "FILE NAME MARK" menu enables following functions when recording images.

- Function to select recording folders.
- Function to select file marks which are added to the end of file names.
- Function to select titles.

(For details of the "FILE NAME MARK" menu, refer to "5.2 Using the live screen/freeze screen" (P. 41)).

6 Select the strings in the preset title list registered in advance, and short-press the [MEAS/ENTER] joystick.

This records the still image.

The screen shows "STILL" during recording a still image. The screen goes black for a moment and then the frozen image is displayed.



NOTE

- Setting "OFF" in the "FILE NAME MARK" menu enables to record the image immediately after operating Step 3.
- The recorded still image can be measured in some cases. For details, refer to "6.7 Measurement" (P. 63).

Recording a movie image

1 Select the folder of the save destination.

See "4.3 Switching the folder from the live screen" (P. 31) for details about operations.

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

The name of the folder in which to save images appears.

3 Check the name of the folder, select [YES] and short-press the [MEAS/ENTER] joystick.

If you want to change the folder, select [MODIFY], change the folder of the save destination and short-press the [MEAS/ENTER] joystick.



- 4** Select the mark to add to the end of the file name of the image you are recording, short-press the [MEAS/ENTER] joystick.



- 5** Select the strings in the preset title list registered in advance, and short-press the [MEAS/ENTER] joystick.



After a still image is recorded, the movie image recording confirmation window will appear.

- 6** Select "YES" and then press the [MEAS/ENTER] joystick.
This starts movie image recording. The USB flash drive indicator flashes on the LCD monitor while movie recording is in progress. If you select [NO] in the moving image confirmation window, only the still image is recorded but the moving image is not recorded.
- 7** To finish movie recording short-press the [FRZ/REC] button.
The flashing USB flash drive indicator disappears from the screen when movie recording is complete.

NOTE

- If "OFF" is set in the "FILE NAME MARK" menu, Step 3 to 5 is skipped.
- Never attempt to insert or remove the USB flash drive while movie recording is in progress. Doing so will cause movie recording to stop and an error message to appear on the display.
- Recording stops automatically whenever the USB flash drive becomes full or when the file size reaches 4 GB. An empty 1 GB USB flash drive has enough capacity to record approximately 30 minutes.
- Short-pressing the [VIEW] button stops movie recording and displays the retrieve screen, long-pressing the [VIEW] button stops movie recording and displays the thumbnail screen.

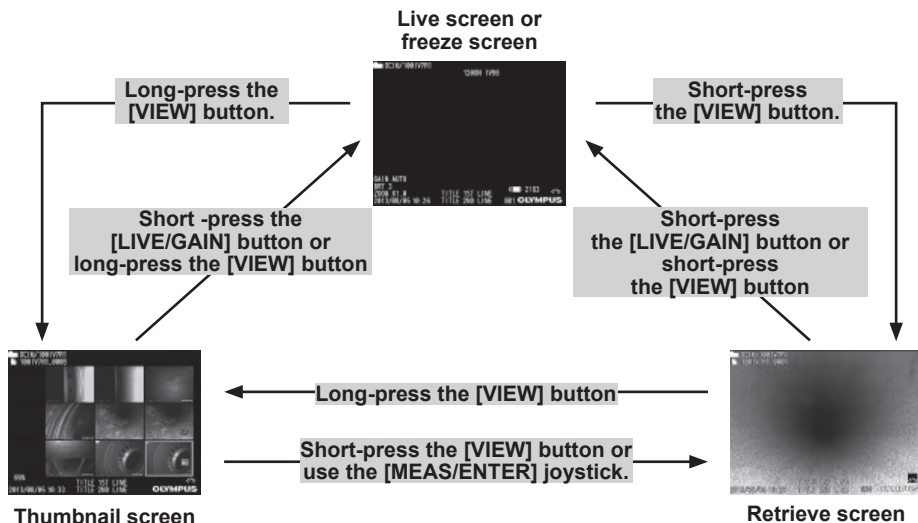
Appending a moving image (RX only)

You can append newly a moving image to the last moving image. Please 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.

4.5 Replaying an image

Recorded images can be displayed using either of two screen views: a full-screen view of a single image (retrieve screen) or a multi-image view of thumbnail images (thumbnail screen). The thumbnail screen shows multiple images at a single glance, which makes it useful when finding a particular image among a large group of images.

Check to make sure the USB flash drive is loaded before starting playback.



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

- 1 Select the folder of the save destination.**
See "4.3 Switching the folder from the live screen" (P. 31) for details about operations.
- 2 While the live screen, freeze screen, or thumbnail screen is displayed, short-press the [VIEW] button.**
This will display a full-screen view of the newest recorded image.
- 3 Switch the image you want to play back.**
Use the [MEAS/ENTER] joystick to switch the image you want to play back.
 - [MEAS/ENTER] joystick left operation
Scrolls from the currently displayed image to the image chronologically before it.
When images are sorted in descending order, performing this operation when at the last image will return to the first image.
 - [MEAS/ENTER] joystick right operation
Scrolls from the currently displayed image to the image chronologically after it.
When images are sorted in ascending order, performing this operation when at the last image will return to the first image.
- 4 Short-press the [VIEW] button or [LIVE/GAIN] button to return to the live screen.**

NOTE

- The recorded still image can be measured in some cases. For details, refer to "6.7 Measurement" (P. 63).

Multi-image view (thumbnail screen)

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


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


1 Select the folder of the save destination.

See "4.3 Switching the folder from the live screen" (P. 31) for details about operations.

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

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

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

The measurement indicator () is displayed on the measured image.

■ To select a thumbnail

Move the [MEAS/ENTER] joystick up, down, left or right to move the selection boundary around the screen

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

■ To play back an image

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

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

■ To select multiple images to move or delete them

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

● To select all thumbnails

Pressing the [BRT] lever toward [▼] will put a check mark (✓) in the upper right corner of all thumbnail images.

● To remove a check mark

From a specific image only

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

From all thumbnails that have check marks (✓)

Press the [BRT] lever toward [▼].

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

4.6 Displaying a PDF file (RX only)

You can display a PDF file on the Live or Freeze screen.


Preparing a PDF file

- 1** Create folder named "PDF" in the USB flash drive connected to your computer and copy PDF files you want to display into the folder.
- 2** Connect the USB flash drive to the USB port of the main unit.


NOTE

- Use alphanumeric characters or symbols to name the PDF file. Otherwise, you are not able to display the PDF file.
-

Displaying a PDF file

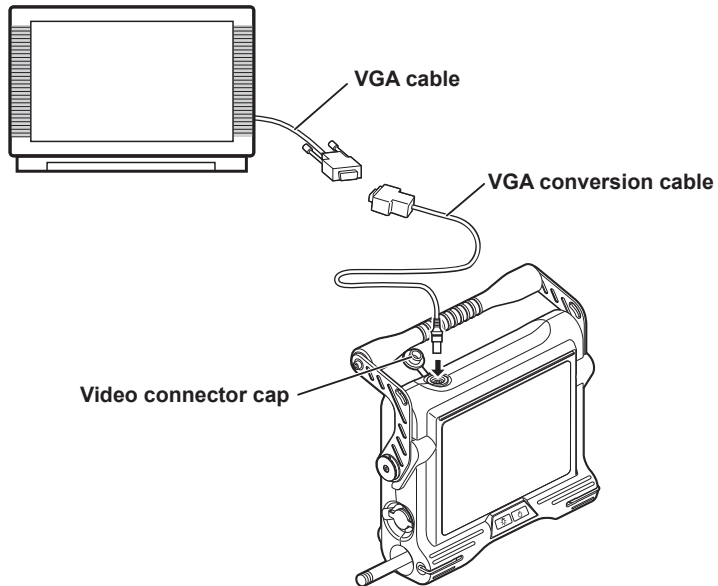
- 1** Press the [MENU/EXIT] button to display the menu screen.
- 2** On the main menu select  icon and push the [MEAS/ENTER] joystick. The PDF files in the "PDF" folder will be listed.
- 3** Select the PDF file you want to display and push the [MEAS/ENTER] joystick. The PDF file will be displayed.

NOTE

- Pressing the [VIEW] button (held down for a short time) allows you to switch over between the PDF file and the Live or Freeze screen. When the switchover between the PDF file and the Live or Freeze screen is enabled,  indicator is displayed on the upper right of the Live or Freeze screen.
 - If fonts are not embedded in PDF file, characters other than alphanumeric and symbols will be displayed as space.
-

4.7 Displaying live images on an external monitor

The live image can be displayed on the external monitor by connecting the provided VGA conversion cable connected to the video output connector of the main unit to the VGA cable (commercially available) connected to the external monitor (commercially available).



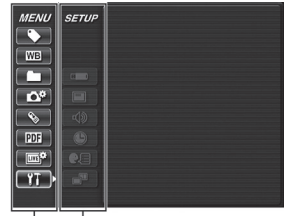
4.8 Using recorded images on a PC

InHelp VIEWER can be used to make use of images recorded on this instrument. Recorded images are loaded directly on the PC from the USB flash drive containing those images. To use InHelp VIEWER software, download it from the Olympus website (<http://www.olympus-ims.com/en/service-and-support/downloads/>).

5 Menu operations and functions

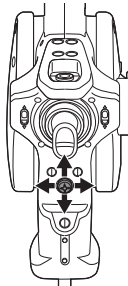
5.1 Performing menu operations

- 1** Press the [MENU/EXIT] button.
This displays the menu screen.

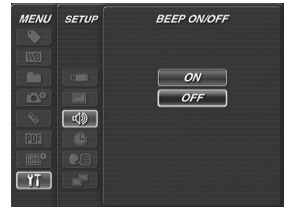


Main menu Sub menu

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



- 3** Press the [MEAS/ENTER] joystick to apply the setting and return to the previous screen.



NOTE






- Pressing the [MENU/EXIT] button while doing menu operations, returns to the previous screen.
- Pressing the [LIVE/GAIN] button while doing menu operations, returns to the live screen.









5.2 Using the live screen/freeze screen

Menu display and functions







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



*: Initial default

| Main menu | Sub menu | Available settings |
|--|---|---|
| TITLE INPUT  | - | Title input A title can be displayed in the live screen and in recorded images. Input can be up to 30 characters. See "Inputting a title" (P. 44). |
| WHITE BALANCE  | - | White balance adjustment (Live screen only) Specifies whether to perform white balance. <ul style="list-style-type: none"> • CANCEL : Do not adjust. • EXECUTE : Adjust. After changing the optical adapter, capture an image of a white object, such as a piece of paper, from a distance of 50 to 60 mm. |
| CHANGE FOLDER  | - | Switching, renaming or newly creating a folder for image recording and playback Switches the folder for recording and playing back the image, changes the folder name, and creates the folder. The default is "100IV7R1". Switches to the folder displayed on the menu screen. For operations to switch to the folder which is not displayed on the menu screen, see "4.3 Switching the folder from the live screen". |
| RECORD  | FILE NAME MARK  | Letter appending to the end of image file names Specifies whether a letter should be added to names assigned to recorded image files. This feature helps to categorize image files. <ul style="list-style-type: none"> • ON : Append letter. You can select from among "_A", "_B", "_C", and "_D". Selecting "ON" displays a dialog box for selecting the letter to be appended to each image file name. <div style="border: 1px solid black; padding: 2px; width: fit-content;"> NOTE </div> <ul style="list-style-type: none"> • The function to select recording folder, the function to select file marks and the function to select titles are also enabled when recording images. <hr/> <ul style="list-style-type: none"> • OFF* : Do not append letter. |

| Main menu | Sub menu | Available settings |
|---|---|---|
| RECORD  | PRINT SCREEN ON/OFF  | Date, title, and other information recording Specifies date, time, title, logo and other information included on the display and measurement results should be recorded in images. <ul style="list-style-type: none"> • ON : Record information • OFF *: Do not record information |
| | REC FUNCTION  | [FRZ/REC] button image type setting Specifies the type of image that is recorded when a record operation is performed with the [FRZ/REC] button. Long-pressing the [FRZ/REC] button performs one of the following operations. <ul style="list-style-type: none"> • STILL+MOVIE *: <ul style="list-style-type: none"> Live screen : Records still image and movie. Freeze screen : Record still image only. • STILL ONLY: <ul style="list-style-type: none"> Live screen : Record still image only. Freeze screen : Record still image only. |
| SELECT OPTICAL ADAPTER  | - | Optical adapter selecting Specifies an optical adapter. When using the stereo optical adapter with RX, see "6.2 Attaching the stereo optical adapter" (P. 53). |
| SELECT PDF FILE (RX only)  | - | PDF file selection Selects PDF files stored in the "PDF" folder on the USB flash drive so that they can be viewed. See "5.4 Operations in the PDF file display screen (RX only)" (P. 49) for details about operations. |
| IMAGE MODE (RX only)  | SHARPNESS  | Adjusts the sharpness of the image The sharpness level increases in the order of "-1, 0, 1 and 2". See "Adjusting image sharpness (RX only)" (P. 46). When using the stereo optical adapter with RX, there are some restrictions in operations. For details, refer to "Observing measurement area" (P. 60) and "Measuring the distance to the measurement area by spot ranging" (P. 61). |
| | SATURATION  | Adjusts the color of the image <ul style="list-style-type: none"> • MONOTONE : Displays the image in monochrome. • NATURAL : Displays the standard observed image. • VIVID : Emphasizes the entire image. See "Adjusting image saturation (RX only)" (P. 46). |

*: Initial default

| Main menu | Sub menu | Available settings |
|---|---|--|
| SETUP  | MEDIA FORMAT  | The USB flash drive formatting (initialization) <ul style="list-style-type: none"> • CANCEL : Do not format the USB flash drive. • EXECUTE : Format the USB flash drive. CAUTION <ul style="list-style-type: none"> • Never remove the USB flash drive while formatting is in progress. NOTE <ul style="list-style-type: none"> • Formatting the USB flash drive deletes all of its data. |
| DATE/TIME/ LOGO  | Display information setting Specifies whether display information (date and time, title, etc.) should be shown on the LCD monitor. This setting can also be used to specify the type of information to be displayed. ALL : Show the date, time, title, "OLYMPUS" logo, optical adapter name, zoom level, and brightness level. DATE/TIME/LOGO* : Show the date, time, title, and "OLYMPUS" logo. DATE/TIME : Show the date, time, and title. OFF : Hide information. | |
| BEEP ON/ OFF  | Specifies whether to sound the beep Specifies whether beep tones sound from the built-in speakers. • ON* : Sound. • OFF : Do not sound. | |
| DATE TIME  | Date and time settings Configures date and time settings. See "Setting the date and time" (P. 47). | |
| LANGUAGE  | Display language selection Specifies the language used for menus and messages. English and other languages are supported. The default is "English". See "Changing the display language" (P. 47). | |

| Main menu | Sub menu | Available settings |
|--|---|--|
| SETUP  | STEREO ADAPTER IM- AGE DISPLAY MODE  | <p>Sets the screen in monocular view or binocular view</p> <p>Sets the display mode of the live image to either the monocular view type or the binocular view type.</p> <p>MONOCULAR IMAGE* : Displays the image in monocular view (one screen)</p> <p>BINOCULAR IMAGE : Displays the image in binocular view (two screens)</p> <p>This setting is reflected to RX (stereo measurement function) only. See "Observing measurement area" (P. 60). for details of the display mode.</p> |

Inputting a title

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

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

■ Input text from the on-screen keyboard



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

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

• To delete characters

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

• To input a space

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

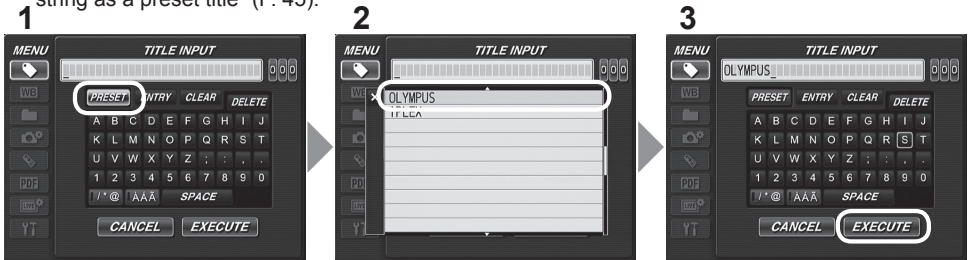
- 3** Select [EXECUTE] and then press the [MEAS/ENTER] joystick.

This displays the title you input on the LCD monitor.

■ Selecting a preset title for input

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

For information about how to register frequently used text strings, see "Registering a character string as a preset title" (P. 45).



1 Select [PRESET] and then press the [MEAS/ENTER] joystick.

This displays a list of preset titles. To cancel preset title selection, press the [MEAS/ENTER] joystick left to close the list screen.

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

The text string you select appears in the title input box.

Repeat steps 1 and 2 to complete input of the title.

NOTE

- The preset title list has five pages. To change pages, select the text string in line 1 or line 10 of the currently displayed page and then tilt the [MEAS/ENTER] joystick upwards or downwards.

3 Select [EXECUTE] and then press the [MEAS/ENTER] joystick.

This displays the title you selected on the LCD monitor.

Registering a character string as a preset title

After you register commonly used character strings to favorites, you can recall them when you are inputting titles. You can register a maximum of 50 character strings to preset titles.



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

For details about inputting, see "Inputting a title" (P. 44).

2 Select [ENTRY] and then press the [MEAS/ENTER] joystick.

A list of preset titles is displayed.

To cancel preset title registration, press the [MEAS/ENTER] joystick left to close the list screen.

NOTE

- The preset title list has five pages. To change pages, select the text string in line 1 or line 10 of the currently displayed page and then tilt the [MEAS/ENTER] joystick upwards or downwards.

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

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

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

4 Press [MEAS/ENTER] joystick towards the left.

This closes the preset title list screen.

Adjusting image sharpness (RX only)

The sharpness of the image can be emphasized.

IMAGE MODE > SHARPNESS



Pressing the [MEAS/ENTER] joystick toward right or left enables to change the frame sharpness level.

If you get the suitable sharpness, press the [MEAS/ENTER] joystick.

Adjusting image saturation (RX only)

The saturation of the image can be adjusted.

IMAGE MODE > SATURATION



Pressing the [MEAS/ENTER] joystick toward right or left enables to change the image saturation level.

If you get the suitable image saturation, press the [MEAS/ENTER] joystick.

Setting the date and time

Use the procedure below to configure date and time settings.

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



Be sure to set the correct date and time before using the instrument for the first time.

Date and time information is shown on the display and is also recorded on the print screen. Data recording is also performed in accordance with date and time information.

Changing the display language

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

SETUP > LANGUAGE > Select a language.



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







NOTE

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

5.3 Using the thumbnail/retrieve screens

Menu display and functions

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

| Menu | Available settings |
|---|--|
| DELETE  | Image delete <ul style="list-style-type: none"> • CANCEL : Do not delete image. • EXECUTE : Delete image. <p>On the retrieve screen, the currently displayed image is deleted. On the thumbnail screen, the currently selected image or all images that are check marked (✓) are deleted.</p> |
| CHANGE FOLDER  | Switching, renaming or newly creating a folder for image recording and playback (Thumbnail screen only) <p>Switches the folder for recording and playing back the image, changes the folder name, and creates the folder.</p> <p>The default is "100IV7R1". Switches to the folder displayed on the menu screen. For operations to switch to the folder which is not displayed on the menu screen, see "4.3 Switching the folder from the live screen".</p> |
| COPY FILE  | Copy image files to folder (Thumbnail screen only) <p>Copies recorded images to a different folder. The currently selected image or all images that are check marked (✓) on the thumbnail screen are copied.</p> |
| MOVE FILE  | Move image files to folder (Thumbnail screen only) <p>Moves recorded images to a different folder. The currently selected image or all images that are check marked (✓) on the thumbnail screen are moved.</p> |
| RENAME FILE  | Rename file (Thumbnail screen only) <p>Changes the name of a recorded image file (within 30 letters).</p> |
| MEDIA FORMAT  | The USB flash drive formatting (initialization) <ul style="list-style-type: none"> • CANCEL : Do not format the USB flash drive. • EXECUTE : Format the USB flash drive. <p>CAUTION _____</p> <ul style="list-style-type: none"> • Never remove the USB flash drive while formatting is in progress. <p>_____</p> <p>NOTE _____</p> <ul style="list-style-type: none"> • Formatting the USB flash drive deletes all of its data. <p>_____</p> |

NOTE _____
















- You can use only alphanumeric characters and symbols for folder and file names. Some symbols are unavailable for folder and file names also.



5.4 Operations in the PDF file display screen (RX only)

Menu items and functions

On the menu on which the PDF file is displayed, you can work with that PDF file as shown below.

*: Initial default

| PDF main menu | PDF submenu | Available settings |
|---|---|--|
| MOVE PDF DOCUMENT  |  * | Displays the top page |
| |  | Displays the previous page Pressing the [BRT] lever toward [▲] gives you the same effect. |
| |  | Displays the next page Pressing the [BRT] lever toward [▼] gives you the same effect. |
| |  | Displays the last page |
| |  | Displays your desired page |
| EXPAND/SHRINK PDF DOCUMENT  |  | Displays the whole page |
| |  * | Displays the page to fit width |
| |  | Displays the page to fit height |
| |  | Zooms in the page Pressing the [ZOOM] lever toward [T] gives you the same effect. |
| |  | Zooms out the page Pressing the [ZOOM] lever toward [W] gives you the same effect. |
| ROTATE PDF DOCUMENT  |  | Rotates the page counterclockwise Rotates all other pages in the document. |
| |  | Rotates the page clockwise Rotates all other pages in the document. Pressing the [MEAS/ENTER] joystick gives you the same effect. |

| PDF main menu | PDF submenu | Available settings |
|--|-------------|---|
| DISPLAY PDF INFORMATION  | - | Allows you to display or hide the PDF file name, page number of current page/total pages, position in page of portion being displayed (vertical/horizontal), and scroll bars on the PDF screen ON: Display OFF: Hide |
| SPLIT SCREEN ON/OFF  | - | Allows you to split and display the PDF screen and live or freeze screen However, the split mode will be terminated when you start up a spot ranging screen or measurement screen. You can switch over between the PDF screen and the live or freeze screen by pressing the [VIEW] button (held down for a short time). ON: Splits the display. OFF: Do not split the display. |

6 Stereo measurement procedures (RX (stereo measurement function) only)

The stereo optical adapter (optional) and the function expansion (optional) IPLEX RX (stereo measurement function) are needed to do stereo measurements.

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.

As the measurement results obtained here are affected by surface conditions of the measurement object or image capturing conditions such as the brightness, Olympus cannot guarantee the accuracy of measurement results. We recommended that users identify the measurement accuracy through experiments.

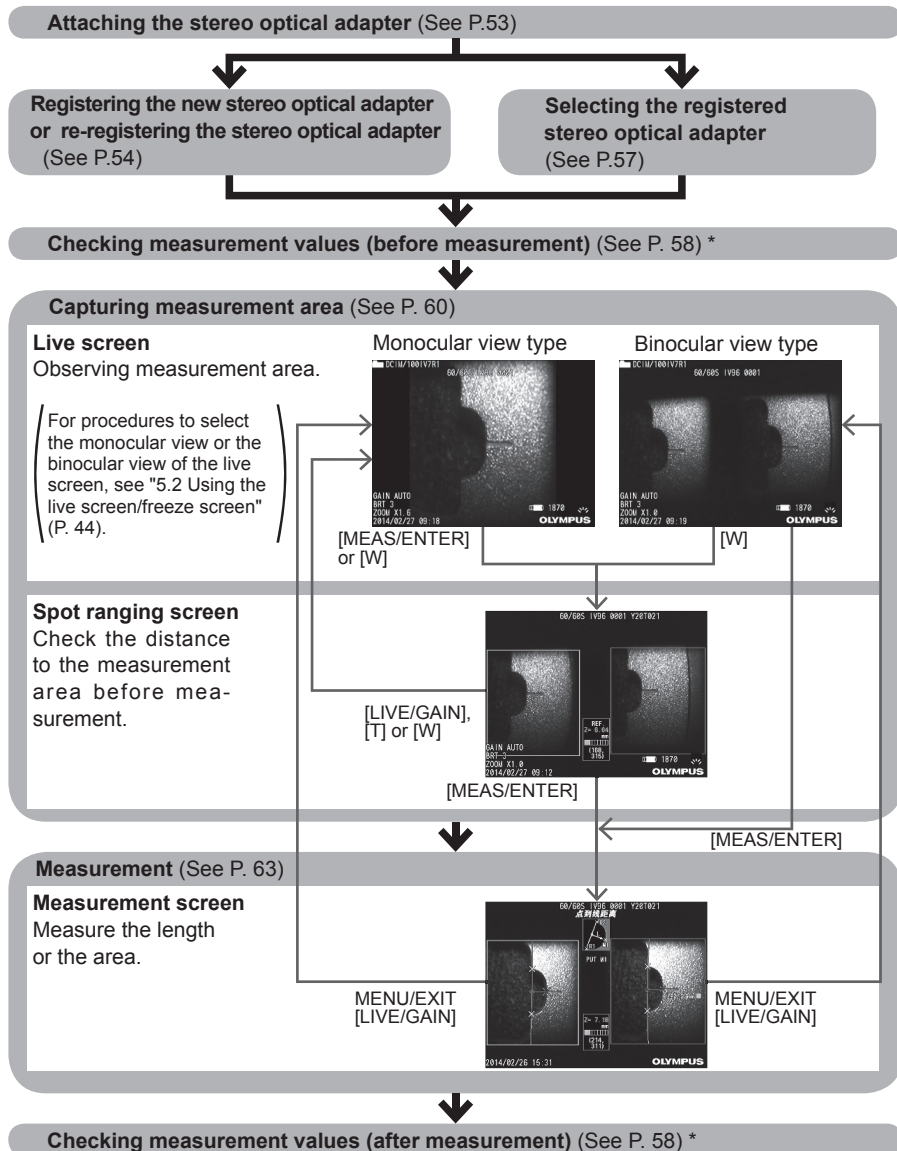
This measurement method identifies a pair of corresponding points on the left image and the right image (same location) obtained by using two objective lenses that are set in parallax. If the corresponding points cannot be identified properly, the correct measurement results cannot be obtained. Understand the information in each Chapter fully before using the stereo measurement function.

This stereo measurement function allows you to select the display mode of the live image from either the monocular view type or the binocular view type.

The monocular view type is a display mode to observe the approach to the measurement area easily on the screen.

6.1 Measurement Flow

The following shows measurement procedures and the screen flow.

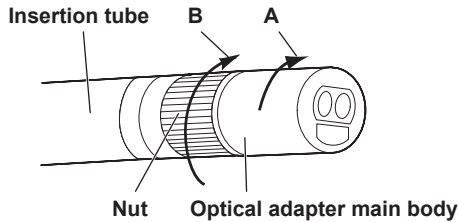


* Make sure that the measurement values obtained when "Checking measurement values (before measurement)" and when "Checking measurement values (after measurement)" are almost identical. If the measurement values differ from each other, check that the optical adapter is not loose and the lens is not dirty and, if required, re-register the stereo optical adapter.

6.2 Attaching the stereo optical adapter

See also "3.3 Pre-operation/post-operation inspections" (P. 25) for more information on attaching stereo optical adapters.

- 1 Make sure that the O-ring in the distal end is properly attached.**
See "3.3 Pre-operation/post-operation inspections" (P. 25) for information on how to check the O-ring.
- 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.
- Make sure that the stereo optical adapter is attached properly without loose and without dirt or dust.
- If the attached optical adapter rattles or is loose, or even though it does not rattle or is not loose, if it is not firmly attached completely by rotating in the direction of arrow A shown in the picture, the measurement accuracy deteriorates.
- After installation of the optical adapter, if the distal end 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, do not hold it by the optical adapter, always grasp the insertion tube. However, do not hold it by the angulation section.
- When the insertion tube's distal end 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 insertion tube, always check the installation condition before inserting the insertion tube into the observation measurement area.

6.3 Registering the new stereo optical adapter or re-registering the stereo optical adapter

To use a stereo optical adapter for stereo measurements, you need to register the stereo optical adapter to the main unit in advance.

If the combination of the stereo optical adapter and the insertion tube is changed due to purchasing the additional optical adapter or repairing the insertion tube, etc., you need to register the new stereo optical adapter as well.

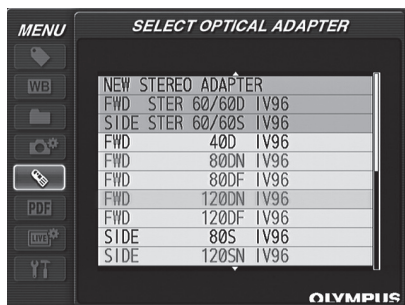
Also, if there is a difference in measurement values when measurement values were checked, you need to re-register the stereo optical adapter in the same procedures as those of the new registration.

This registration is an operation to create the information for the combination of your stereo optical adapter and the insertion tube.

The information that is created is stored in the internal memory of the main unit.

Registering the new stereo optical adapter

- 1 Attach the stereo optical adapter to the insertion tube's distal end.**
See "6.2 Attaching the stereo optical adapter" (P. 53) for details about operations.
- 2 Select "SELECT OPTICAL ADAPTER" in [Menu Operation], and select "NEW STEREO ADAPTER". Then press the [MEAS/ENTER] joystick.**



- 3 Insert an optical data media (USB flash drive) into the USB connector.**
If the USB flash drive for recording images is inserted, the message is displayed. Remove the USB flash drive for recording images and insert an optical data media.



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



- 5** Make sure that the O-ring is attached to the distal end of the insertion tube and also the stereo optical adapter is securely attached. Select "OK" and then press the [MEAS/ENTER] joystick.

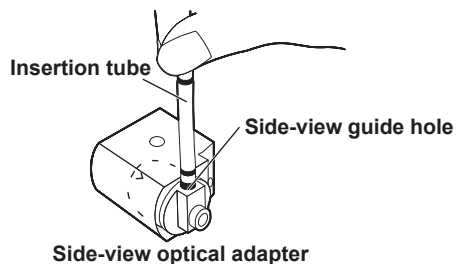
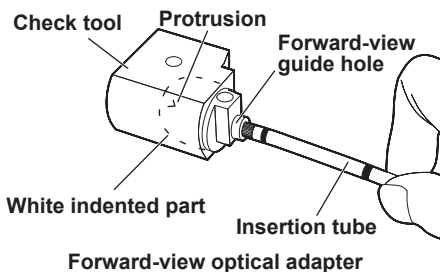
See "6.2 Attaching the stereo optical adapter" (P. 53) for details about operations.



- 6** Adjust the brightness of a white image.

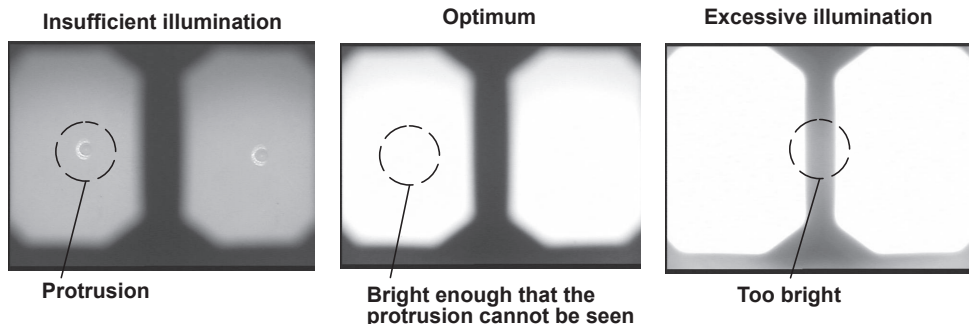
Use the check tool provided with the stereo optical adapter.

Insert the distal end of the insertion tube into the forward-view guide hole or the side-view guide hole until it touches the end. Rotate the check tool to adjust the direction so that the protrusion in the center of the white indented part comes close to the center of the view field. Then, adjust the brightness by using the [BRT] lever.



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.



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 a commercially available absolute ethanol or isopropyl alcohol to wipe off the dirt. To reattach the guide, repeat these steps in reverse order.

7 Press the [FRZ/REC] button to freeze the white image.

Hold the insertion tube 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.

8 The following message is displayed. Remove the optical data media (USB flash drive) from the USB connector and then select "OK" and press the [MEAS/ENTER] joystick.

"Remove the optical data media."

Keep the optical data media (USB flash drive) in the optical adapter case so it does not get lost.

9 Check measurement values.

After the stereo optical adapter is registered, the measurement values must be checked.

See "6.5 Checking measurement values" (P. 58) for details about operations.

NOTE

- After the registration of the stereo optical adapter is completed, a file with the name "IV7CALIB\FREEZE.JPG" is created on the optical data media (USB flash drive). Removing this file does not affect operation.

Re-registering the stereo optical adapter

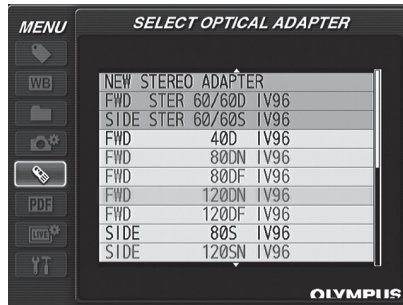
Re-register the stereo optical adapter in the same procedures as those of "Registering the new stereo optical adapter" (P. 54).

6.4 Selecting the registered stereo optical adapter

If the stereo optical adapter has been registered, select the stereo optical adapter on the optical adapter selection screen.

- 1 When the stereo optical adapter is attached to the insertion tube's distal end, select "SELECT OPTICAL ADAPTER" in [Menu Operation].

A list of the optical adapters is displayed.



- 2 Select the registered stereo optical adapter, and press the [MEAS/ENTER] joystick.

The message to check the adapter name and Serial number is displayed.

- 3 Confirm that Serial No. is matched with Serial number of the stereo optical adapter. Select "OK" and press the [MEAS/ENTER] joystick.

The live image is displayed in the monocular view type or the binocular view type.

- 4 Check measurement values.

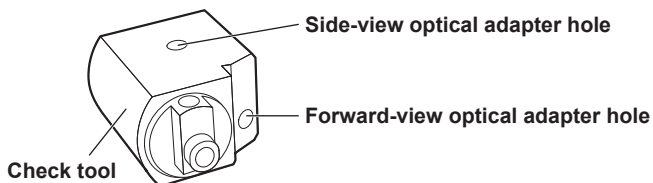
After the stereo optical adapter is selected, the measurement values must be checked.

See "6.5 Checking measurement values" (P. 58) for details about operations.

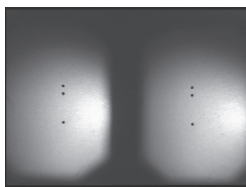
6.5 Checking measurement values

The measurement accuracy may be reduced by loose attachment of the optical adapter or dirt on the lens components. Confirm the measurement values after the stereo optical adapter is registered, selected or before and after measurement.

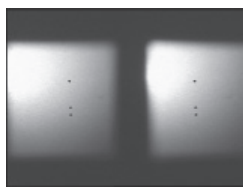
- 1** Insert the insertion tube's distal end into the optical adapter hole of the check tool (included with the stereo optical adapter) to the end.



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



For forward-view optical adapter



For side-view optical adapter

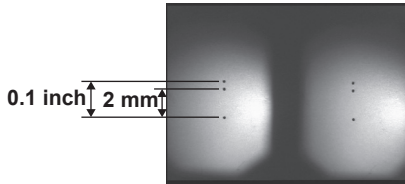
- 3** While a live image is displayed, press the [ZOOM] lever toward [W].
The spot ranging screen is displayed.
- 4** After confirming that the distance is 15 mm or less in [Object distance], press the [MEAS/ENTER] joystick.
The measurement method selection screen is displayed.
See "Measuring the distance to the measurement area by spot ranging" (P. 61) for details about operations.
- 5** Select [Distance] and then press the [MEAS/ENTER] joystick.
The measurement screen is displayed.
- 6** Use the [MEAS/ENTER] joystick to specify the measurement points (2 points).
See "Measurement" (P. 63) for details about operations.

7 Write down the measurement results.

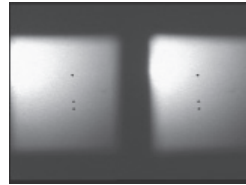
8 When confirming the measurement values after the stereo optical adapter is registered or selected, make sure that the measurement results are within $\pm 5\%$.

When confirming the measurement values before and after measurement, compare the measurement values before and after measurement and make sure that both measurement values are almost identical.

If the measurement results differ significantly from each other, check that the optical adapter is not loose and the lens is not dirty and, if required, re-register the stereo optical adapter. (see "6.3 Registering the new stereo optical adapter or re-registering the stereo optical adapter" (P. 54)).



For forward-view optical adapter



For side-view optical adapter

NOTE

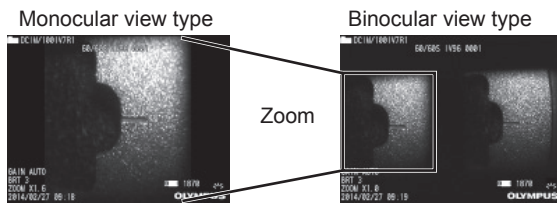
- If the optical adapter is loose, make sure that the O-ring has not been detached (see "Attaching the optical adapter" (P. 15)).

6.6 Capturing measurement area

Observe the measurement area and confirm that the image is appropriate for measurement. Use the spot ranging to confirm that the distance between the distal end of the optical adapter and the measurement area is appropriate.

Observing measurement area

Observe the measurement area by setting your favorite display mode to either the monocular view type or the binocular view type.



See also "4.1 Viewing an observation object" (P. 27) for more information on observing measurement area.

NOTE

- In case that the measurement area has repetition, reflects easily or has fewer patterns, change the direction or the distance for capturing images.
- In case that there are highlights or the shadow area on the measurement area, move or rotate the position of the insertion tube to change the direction or the distance for capturing images. And, use the [BRT] lever to adjust to the slightly dark image.
- To change the display mode, see "5.2 Using the live screen/freeze screen" (P. 44).
- Restriction for monocular view type
 - A part of the left image in the binocular view type is zoomed in.
- Restriction for binocular view type
 - The zoom function cannot be used.
 - The gain mode cannot be switched. (Fixed to AUTO)
 - The sharpness adjustment cannot be switched. (Fixed to -1)
 - The brightness adjustment range is from 1 to 7. (The monochrome boost is not available.)
- The position of the left and right images may be misaligned in some direction or at an angle depending on the assembly of the optical adapter and the insertion tube, but this is not an abnormality and does not affect the measurement accuracy.



Image Shift: Up, Down, Left, Right



Rotated

Measuring the distance to the measurement area by spot ranging

The spot ranging calculates the distance between the distal end of the optical adapter and the measurement area on the live screen and the freeze screen.

In case of the monocular view type, short-press the [MEAS/ENTER] joystick while displaying the live screen or the freeze screen or press the [ZOOM] lever toward [W] while displaying the live screen. In case of the binocular view type, press the [ZOOM] lever toward [W] while displaying the live screen or the freeze screen.

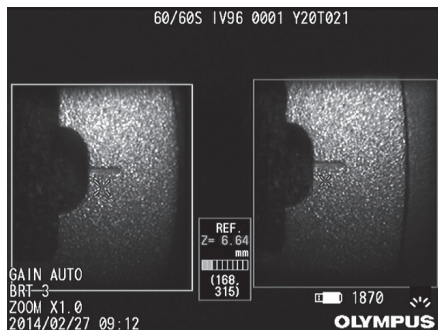
The spot ranging screen is displayed.

NOTE




- The spot ranging cannot be done when recording moving images.
 - The spot ranging is displayed only in the binocular view type.
 - If the [FRZ/REC] button is pressed on the spot ranging screen in live view, the spot ranging screen is frozen.
 - Restriction during spot ranging
 - The zoom function cannot be used.
 - The gain mode cannot be switched. (Fixed to AUTO)
 - The sharpness adjustment cannot be switched. (Fixed to -1)
 - The brightness adjustment range is from 1 to 7. (The monochrome boost is not available.)
-

■ Spot ranging screen

Measure the object distance at the position of the cursor in the left image.

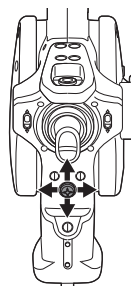


The object distance indicator shows the distance between the distal end of the optical adapter and the measurement area by nine levels.

Up to 15 mm:  (Recommended measurement distance)
 Up to 30 mm:  (Possible measurement distance)
 30 mm and higher: 
 ↑ ↑ ↑
Green Yellow Red

■ Moving the cursor

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



■ Starting the measurement

Short-press the [MEAS/ENTER] joystick. The measurement screen is displayed.

NOTE

- While checking the distance to the measurement area by using the spot ranging function, approach to the measurement area up to the recommended measurement distance. Generally the closer measurement object distance is, the more accurate measurement becomes.

■ Finishing the spot ranging

Press the [LIVE/GAIN] button, or press the [ZOOM] lever toward [T] or [W].

6.7 Measurement

Measurement

- 1 While displaying the spot ranging screen, live/freeze screen (binocular view type) or the retrieve screen (image recorded in the binocular view type), short-press the [MEAS/ENTER] joystick.**

The measurement method selection screen is displayed.

NOTE

- Capture the multiple images with different view points, and measure them.
- Make sure that the measurement area is not blurred on the acquired image.
- The still image recorded in the monocular view type cannot be measured.

- 2 Select the measurement method.**

For details of the measurement method, see "Measurement method types" (P. 66).

Select the measurement method to display the measurement screen.

- 3 Specify the measurement point and confirm the corresponding point.**

Specify the measurement points or reference points in the left image area.

The corresponding points (points in the right image area corresponding to measurement points or reference points specified in the left image area) are displayed in the right image area.

Confirm that positions of measurement points or reference points (in the left image area) are same as positions of corresponding points (in the right image area).

For details of screens, see "Measurement screen" (P. 64), and for detail operations, see "Specification of measurement points" (P. 67).

- 4 Record the measurement result.**

Long-press the [FRZ/REC] button to record the image in the binocular view type and the image with the measurement results.

- 5 Exit from measurement**

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

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

■ Check measurement values

The measurement values must be checked before and after measurement.

See "6.5 Checking measurement values" (P. 58) for details about operations.

Measurement screen

■ Explanation of the measurement screen

Displaying the measurement method

Cursor
Specifies a measurement point or reference point.

Point
Indicates a specified measurement point or reference point.

Left image area

Instruction message box
Shows instructions, conditions, etc.

Corresponding point

Right image area
The three most recent measurement results are displayed. The object distance mark (■) (see "Object distance") indicates the object distance of measurement point.

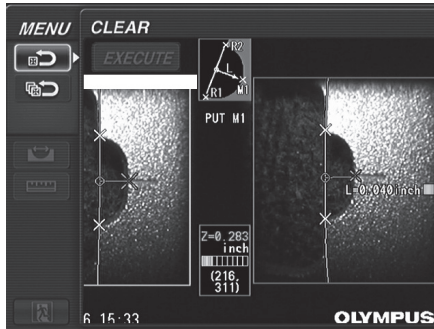
Object distance
The distance from the insertion tube's distal end to the specified measurement point is displayed. The object distance mark (■) is displayed in the following colors.
Up to 15 mm: Green
(Recommended measurement distance)
Up to 30 mm: Yellow
(Possible measurement distance)
30 mm and higher: Red






List of messages displayed in the instruction message box

| Message | Description |
|---------|---|
| PUT M## | Specify measurement point number ## in the left image area. |
| PUT R## | Specify reference point number ## in the left image area. |

■ Menu display and functions

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



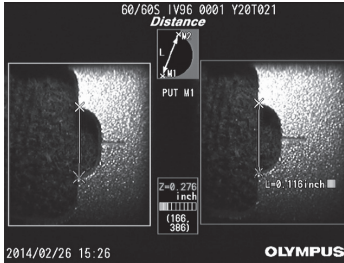
| Menu | Available settings |
|--|--|
| CLEAR  | Clears the measurement point or reference point specified immediately before. |
| ALL CLEAR  | Clears all specified measurement point or reference point. |
| METHOD  | Selects a measurement method. See "Measurement method types" (P. 66) for details about operations. |
| UNIT  | Selects the units of the measurement result from "mm" or "inch". |
| EXIT MEASUREMENT  | Exits the stereo measurement screen. The display returns to the screen before measurement starts. |

Measurement method types

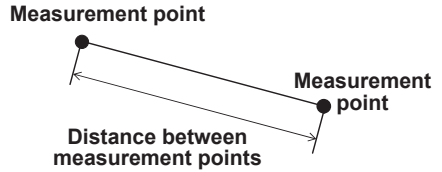
The measurement method selection screen is displayed immediately after starting stereo measurement, or if "METHOD" is selected in the measurement menu screen. The following four measurement methods are available.

■ Distance

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

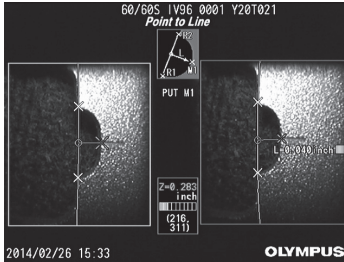


Distance

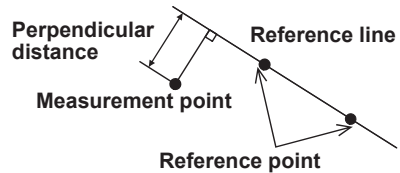


■ Point to line

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

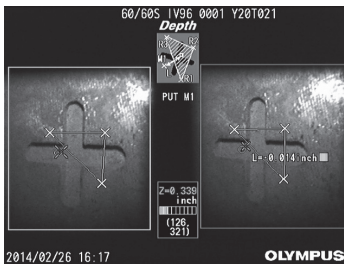


Point to line

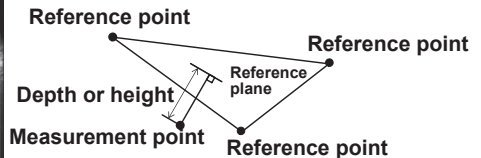


■ Depth

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.

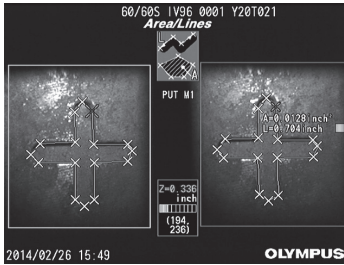


Depth

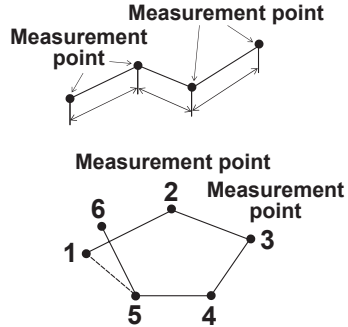


■ AREA/LINES

This mode allows for measuring the total length of multiple lines, each of which is specified by two 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. However, 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



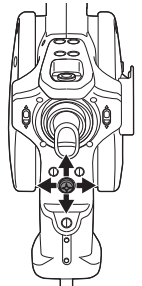
Specification of measurement points

■ 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 method in the left image area on the left side of the screen.

The measurement results and the object distance measured at the cursor (distance between the distal end of the adapter and the measurement area) are displayed.

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



■ Re-specifying a measurement point

Select "CLEAR" in the measurement 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 measurement menu.

7 Storage and maintenance

7.1 Replacing the battery

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

For details about how to load and remove the battery, see "Using the battery" (P. 13).

7.2 Replacing the O-ring

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

The position to attach the O-ring differs between 6-mm type and 4-mm type.

Refer to "2.2 Distal end/optical adapter nomenclature" (P. 11) and "Attaching the optical adapter" (P. 15), and attach the O-ring at the correct position.

7.3 Cleaning components

Cleaning the insertion tube

Dirt or other foreign matter on the insertion tube

Wipe with a clean soft cloth.

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

Do not use a hard cloth or hard brush, but wipe with a soft cloth or cotton swab, and then wash thoroughly with a piece of gauze or other material moistened with a neutral detergent. Next, use a clean, soft piece of soft gauze moistened with clean water, and then wipe the insertion tube dry of all moisture.

CAUTION

- Clean the insertion tube immediately after withdrawing the insertion tube. Leaving the insertion tube very dirty for long periods can cause it to become corroded.
-

Cleaning the distal end

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

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

Best results may be obtained using a commercially available absolute ethanol or isopropyl alcohol.



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

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

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

Cleaning the optical adapter

Dirt or water on the surface of the optical adapter and/or the objective lens in the optical adapter

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

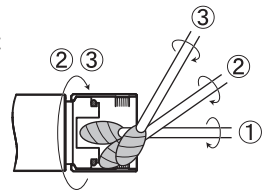
Cleaning dirt from the optical adapter outer surface while attached to the distal end

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

Dirt on the threads of the screws of the optical adapter.

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

Also, for thorough cleaning, turn the optical adapter while doing (2) and (3).



CAUTION

- Do not clean the optical adapter under running water. Otherwise, the optical adapter might be damaged.

Cleaning the LCD monitor

LCD monitor viewing problems due to fingerprints and dirt

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

CAUTION

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

Cleaning the main unit and control unit

If the main unit is dirty, wipe it with a soft cloth dampened with clean water. Next, lightly wipe it with a clean, dry cloth. Also wipe all dirt, water, and other foreign matter from the inside of the battery cover, video connector cap, AC adapter connector and the locations where the control unit connects to the main unit.

7.4 Storage precautions

Store this product under normal room temperature and humidity.

CAUTION

- Never subject cables to severe bending, pulling, binding, twisting, or crushing forces. Do not allow a cable to be exposed to heat, which can melt its covering. Otherwise, cable might be damaged, which can lead to fire and electric shock.
 - Do not store the instrument in the carrying case with the shoulder strap still attached. Otherwise, the LCD monitor might be scratched or the shoulder strap might be damaged.
-

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

8 Troubleshooting

Inspect the equipment as described in "3 Pre-observation/pre-operation preparation and inspection" (P. 13), do not use the equipment if there are any obvious malfunctions. Contact Olympus for repairs. Should even the slightest irregularity be suspected, do not use the instrument. Perform the actions described in "8.1 Troubleshooting guide" (P. 71). If the problem cannot be resolved by the described remedial action, stop using the instrument and send it to Olympus for repair.

8.1 Troubleshooting guide

Error messages

| Message | Cause and recommended action |
|---|--|
| NO RECORDING MEDIA. | The USB flash drive is not loaded. →Load the USB flash drive and try again. Or turn the instrument off, then on again. |
| RECORDING MEDIA FULL. | The USB flash drive is full. →Delete unneeded data to free up space or replace with the USB flash drive. |
| THIS IMAGE CANNOT BE RETRIEVED. | The image was not recorded with this instrument. →Only images recorded with this instrument can be displayed. |
| RECORDING MEDIA ERROR. PLEASE FORMAT THE RECORDING MEDIA. | The format of the USB flash drive cannot be recognized. →Format the USB flash drive on the instrument. |
| IMAGER ERROR. PLEASE TURN OFF THE POWER. | The self-check function activated and prompted termination of operation. →Stop inspection and turn the instrument off, then on again. |
| OVER CURRENT (USB). PLEASE TURN OFF THE POWER. | The USB flash drive being used is not recommended for this system →Stop inspection and turn the instrument off, then on again. Use recommended USB flash drive. |
| | A USB device other than the USB flash drive is connected. →Disconnect all USB devices except the USB flash drive. |
| LOW BATTERY. PLEASE CONNECT TO THE AC ADAPTER OR TURN OFF THE POWER. | Battery voltage is low. →Stop all image recording, copy, and delete operation, the USB flash drive format operations, etc., and immediately replace the battery. Or you connect the AC adapter. |
| IMAGE CAPTURE ERROR. PLEASE TURN OFF THE POWER. | Self-check triggers during use and displays a message. →Stop inspection and turn the instrument off, then on again. |

| Message | Cause and recommended action |
|--|---|
| HIGH TEMPERATURE (DISTAL END). PLEASE IMMEDIATELY PULL OUT THE SCOPE. | The message prompts you to stop inspection because the self-check function was triggered. →Immediately pull the insertion tube out of the observation object. NOTE <ul style="list-style-type: none"> This message will appear before the atmospheric temperature of the distal end reaches the maximum operating ambient temperature. |
| HIGH TEMPERATURE (MAIN UNIT). PLEASE TURN OFF THE POWER. | The message prompts you to stop operations because the inside of the main unit was too hot and triggered the self-check function. →Terminate inspection, allow the instrument to cool down, and then turn power back on again. |
| OVER CURRENT (ARTICULATION MOTOR). PLEASE TURN OFF THE POWER. | 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. |

Common problems

| Problem | Cause and recommended action |
|--|---|
| Illumination does not light. | The LIGHT button (☞) is not on. →Turn on the LIGHT button (☞). |
| | The insertion tube's distal end or the optical adapter is dirty. →Wipe with a clean piece of gauze or a cotton swab. Or use a brush to remove foreign matter ("Cleaning the distal end" (P. 69) or "Cleaning the optical adapter" (P. 69)). |
| The illumination is dim. | The optical adapter tip is dirty. →Wipe with a clean piece of gauze or a cotton swab. |
| The optical adapter cannot be attached to the insertion tube. | A foreign object is stuck to the screws. →Wipe with a clean piece of gauze or a cotton swab. |
| | The optical adapter in use is not a designated optical adapter for this system. →Use the designated optical adapter. |
| | The installation procedure is not correct. →Reinstall using the correct procedure ("Attaching the optical adapter" (P. 15)). |
| The optical adapter cannot be removed from the insertion tube. | The nut of the optical adapter is rotated in the wrong direction. →Reinstall using the correct procedure ("Attaching the optical adapter" (P. 15)). |

| Problem | Cause and recommended action |
|--|---|
| The system cannot be turned on. | The AC adapter or the battery is not connected. → Connect the AC adapter or the battery correctly. ("Preparing the power supply" (P. 13)). |
| | The Power button is not on. → Turn on the power button (⏻) of the main unit. |
| | A non-designated AC adapter or battery is connected. → Use the designated AC adapter or battery. |
| The system cannot be turned off. | The main unit is damaged. → Remove the AC adapter or the battery from the main unit to turn off the power. |
| The image is not sharp. | The objective lens on the insertion tube's distal end or the optical adapter is dirty. → Wipe with a clean piece of gauze or a cotton swab. |
| | The optical adapter is attached improperly. → Attach the optical adapter properly. |
| | The external monitor is adjusted incorrectly. → Correctly adjust the external monitor. |
| The image brightness is not optimum. | The automatic brightness control is set erroneously. → Perform the [BRT] lever operation to configure the proper setting. |
| | The objective lens on the insertion tube's distal end or the optical adapter is dirty, or the illumination on the optical adapter distal end is dirty. → Wipe with a clean piece of gauze or a cotton swab. |
| | The external monitor is adjusted incorrectly. → Correctly adjust the external monitor. |
| | The optical adapter is old. → Replace the optical adapter with a new one. |
| | The optical adapter is loose. → Attach the optical adapter properly. ("Attaching the optical adapter" (P. 15)). |
| Color reproduction is poor. | The white balance is set improperly. → Re-adjust white balance. |
| The image is noisy. | The automatic brightness control is set erroneously. → Perform the [BRT] lever operation to configure the proper setting. |
| Angulation cannot be returned to its original attitude. | The angulation lock is engaged. → Press down the [ANGLE LOCK] lever to release the angulation lock. |
| 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. | The angulation lock is engaged. → Press down the [ANGLE LOCK] lever to release the angulation lock. |
| The beep can not be heard. | "BEEP ON/OFF" in the "SETUP" menu is set to "OFF". → Set "BEEP ON/OFF" in the "SETUP" menu to "ON". |
| All the functions stopped during motion image recording. | The USB flash drive being used for image recording is not the one provided and is not one recommended by Olympus. → Remove the AC adapter or the battery from the main unit to turn off the power. → Use the USB flash drive for recording images provided as standard or one recommended by Olympus. |
| If you cannot obtain the measurement accuracy in the stereo measurement, carefully read "6 Stereo measurement procedures (RX (stereo measurement function) only)" (P. 51). | |

8.2 Requesting repair of this product

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

Malfunctions that occur during the warranty period are done at no charge according to the warranty agreement. Be sure to attach the warranty agreement when returning the instrument for repairs.

Repair will be charged if the warranty agreement is not attached. The freight fees are paid by the user even if repairs are done free of charge.

Olympus will not repair an instrument contaminated by noxious substances.

9 Specifications

9.1 Operating environment

Operating temperatures

| | |
|------------------------|---|
| Insertion tube | In air: -25 to 100 °C (RX) -25 to 80 °C (RT) In water: 10 to 30 °C |
| Other parts than above | In air: -10 to 40 °C (Battery-powered operation) 0 to 40 °C (AC adapter-powered operation) |

Operating atmospheric pressure

| | |
|------------------------|---|
| Insertion tube | In air: Normal pressure (1,013 hPa) In water: IV94 series 1,013 to 1,368 hPa (up to water depth 3.5 m) IV96 series 1,013 to 1,772 hPa (up to water depth 7.5 m) |
| Other parts than above | In air: Normal pressure (1,013 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 construction. Can be used underwater with the optical adapter attached. The stereo measurement cannot be carried out underwater. |
| Other parts than above | Water resistant proof construction. Use in water is not supported. The instrument is not water-resistant if the battery cover and others are open. |

CAUTION

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

9.2 Other specifications

Optical system

For optical adapter specifications, see "9.3 Optical adapter specifications" (P. 79).

| | |
|--------------|---|
| Illumination | Light from the white LED in the control unit is guided to the distal end via the light guide. |
|--------------|---|

Distal end

| | |
|---------------------------------|---|
| Outer diameter | IV94 series: $\Phi 4.0$ mm IV96 series: $\Phi 6.0$ mm |
| Distal end rigid section length | See the distal end rigid section length specification of the optical adapter in use. |
| Angulation | IV9620RX/RT: 150 ° * IV9420RX/RT, IV9435RX/RT, IV9635RX/RT: 130 ° * IV9650RX/RT: 120 ° * IV9675RX/RT: 100 ° * * UP, DOWN, RIGHT and LEFT each direction. The insertion tube is straight. |

Flexible section

| | |
|---------------------|---|
| Flexibility | IV94 series: Fixed hard tube from the insertion tube's distal end to the control unit. IV96 series: TF tube with flexibility gradually increasing toward the distal end. |
| Outer diameter | IV94 series: Φ 4.0 mm IV96 series: Φ 6.0 mm |
| Index lines | An orange line is drawn at the position of 500 mm from the insertion tube's distal end. White lines are drawn at every 1000 mm from the insertion tube's distal end. The number of white lines is increased at every 1000 mm (1 line at 1000 mm, 2 lines at 2000 mm). |
| Total length | IV9420RX/RT, IV9620RX/RT: 2 m IV9435RX/RT, IV9635RX/RT: 3.5 m IV9650RX/RT: 5 m IV9675RX/RT: 7.5 m |

Control unit

| | |
|------------|--|
| Dimensions | 365(W) x 192(H) x 93(D) mm (without insertion tube and cable) |
|------------|--|

Main unit

| | |
|------------|----------------------------|
| Dimensions | 239(W) x 215(H) x 99(D) mm |
|------------|----------------------------|

| | |
|-----------------------------------|--|
| Weight (including battery) | IV9420RX/RT: 2.9 kg, IV9620RX/RT: 3.1 kg IV9435RX/RT: 3.0 kg, IV9635RX/RT: 3.2 kg IV9650RX/RT: 3.3 kg IV9675RX/RT: 3.5 kg |
|-----------------------------------|--|

| | |
|------------------|---|
| LCD panel | 6.5 inch TFT full-color low reflective-coating type |
|------------------|---|

Input/Output connector

| | |
|---------------|---------------------------------|
| USB connector | A connector, USB 2.0 compatible |
|---------------|---------------------------------|

Power supply

| | |
|--------------------------------|---|
| Battery | Specified battery (Lithium Ion) Model : Manufactured by INSPIRED ENERGY NC2040NO29 Nominal voltage : 10.8 V DC Nominal capacity: 31 Wh Battery powered operating time: Approximately 120 minutes (based on new battery) For details, refer to the instruction manual of your battery charger. |
| AC adapter for main unit | Model : Manufactured by Adapter Technology ATS050-P120 Input voltage : 100 V to 240 V AC Frequency : 50/60 Hz Output voltage : 12 V DC |
| AC adapter for battery charger | Model : Manufactured by Adapter Technology ATS065-P240 Input voltage : 100 V to 240 V AC Frequency : 50/60Hz For details, refer to the instruction manual of the battery charger. |

| | |
|--------------------------|----------|
| Power consumption | MAX 15 W |
|--------------------------|----------|

| | |
|------------------------|---|
| Recording media | USB flash drive (For the recommended products, please contact Olympus.) |
|------------------------|---|

Still image recording

| | |
|------------------|--|
| Resolution | H768 x V576 (Pixels) |
| Recording format | Files are stored as compressed JPEG format (Exif 2 compliant). |

Still image retrieval

| | |
|--------------|---|
| Restrictions | Images recorded on the instrument can be played back. |
|--------------|---|

Moving image recording

| | |
|------------------|--|
| Resolution | H640 x V480 (Pixels) |
| Recording format | AVI MPEG-4 formats. Compression rate fixed. 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)) |

Moving image playback

| | |
|--------------|---|
| Restrictions | Images recorded on the instrument can be played back. |
|--------------|---|

Movie output

| | |
|------------|----------------------|
| Format | Analog VGA output |
| Resolution | H640 x V480 (Pixels) |
| Frame rate | 64 fps |

Stereo measurement function (Expanded function RX only)

| | |
|--|--|
| Measurement method | Distance : Distance between two points indicated on the screen. Point to line : Distance from a point to a line (reference line) that is defined by indicating two points on the screen. Depth : Distance from a point to a plane that is defined by indicating three points on the screen. Area : Area of the plane that is defined by indicating multiple points on the screen. Lines : Length of the line connecting multiple points indicated on the screen. |
| Displaying and recording the measurement results | Up to 3 measurement results |
| Spot ranging | Spot ranging indicates approximate value of the distance from the tip of the scope to the measurement area on screen specified by cursor. |
| Restrictions | <ul style="list-style-type: none"> • The stereo optical adapter must be registered to the main unit prior to used. • The stereo optical adapter can be registered for the forward view and side view individually. • Recommended measurement area: Distance up to 15 mm • Measurable area: Distance up to 30 mm |

Carrying case dimensions and weight



| | |
|------------|---|
| Dimensions | 586(W) x 480(H) x 176(D) mm 23.07(W) x 18.90(H) x 6.93(D) inch |
| Weight | Approximately 5.1 kg (with all items stowed: approximately 12 kg) |

| | |
|---------------------|----------------------------------|
| Manufacturer | OLYMPUS CORPORATION TOKYO, JAPAN |
|---------------------|----------------------------------|

NOTE

- The images recorded with the instrument can be displayed on a computer, etc., but playback on the instrument of images recorded with an image recording device such as a digital camera or a computer is not supported.
- All brands are Trademark or registered Trademark of their respective owners.

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 Information | <p>This product conforms to the following.</p> <ul style="list-style-type: none"> • Part 15 of the FCC Rules <p>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> <ul style="list-style-type: none"> • FCC WARNING <p>Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.</p> |
| <p>WEEE Directive</p>  | <p>The following applies to the mark to the left.</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) 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> |

For Korea only

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

9.3 Optical adapter specifications

For 4-mm type insertion tube

When the optical adapter is mounted on the insertion tube.

| Adapter name | | AT120D/NF -IV94 | AT120D/FF -IV94 | AT100S/NF -IV94 | AT100S/FF -IV94 | AT80D/FF -IV94 |
|----------------------|---------------------------|--------------------|--------------------|--------------------|--------------------|-------------------|
| Product abbreviation | | 120DN | 120DF | 100SN | 100SF | 80DF |
| Character color | | Red | Green | Red | Green | Green |
| Optical system | Field of view | 120 ° | 120 ° | 100 ° | 100 ° | 80 ° |
| | Direction of view | Forward | Forward | Side | Side | Forward |
| | Depth of field *1 | 2 to 200 mm | 17 to ∞ mm | 2 to 15 mm | 8 to ∞ mm | 35 to ∞ mm |
| Distal end | Outer diameter*2 | Φ4.0 mm | Φ4.0 mm | Φ4.0 mm | Φ4.0 mm | Φ4.0 mm |
| | Rigid distal end length*3 | 19.0 mm | 19.0 mm | 21.7 mm | 21.7 mm | 19.0 mm |

| Adapter name | | AT50D/50D-IV94 | AT50S/50S-IV94 |
|----------------------|---------------------------|-----------------|----------------|
| Product abbreviation | | 50/50D | 50/50S |
| Character color | | Blue | Blue |
| Optical system | Field of view | 50 °/50 ° | 50 °/50 ° |
| | Direction of view | Forward/forward | Side/side |
| | Depth of field *1 | 5 to ∞ mm | 4 to ∞ mm |
| Distal end | Outer diameter*2 | Φ4.0 mm | Φ4.0 mm |
| | Rigid distal end length*3 | 24.3 mm | 28.4 mm |

- *1 Indicates the range within which the image can be viewed clearly.
- *2 Can be inserted into a Φ4.0 mm hole when mounted on the insertion tube.
- *3 Indicates the length of the rigid portion at the insertion tube's distal end when mounted.

For 6-mm type insertion tube

When the optical adapter is mounted on the insertion tube.

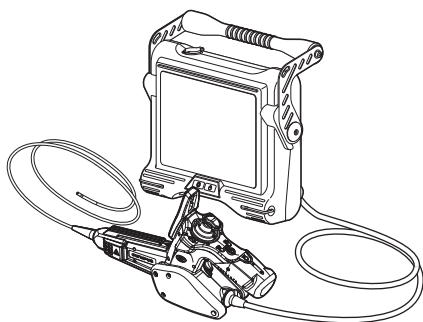
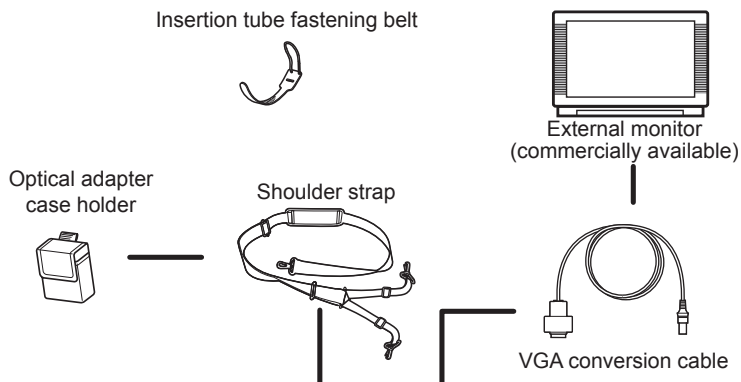
| Adapter name | | AT40D-IV96 | AT80D/NF -IV96 | AT80D/FF -IV96 | AT120D/NF -IV96 | AT120D/FF -IV96 |
|----------------------|---------------------------|-------------|-------------------|-------------------|--------------------|--------------------|
| Product abbreviation | | 40D | 80DN | 80DF | 120DN | 120DF |
| 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 | 9 to ∞ mm | 35 to ∞ mm | 2 to 200 mm | 19 to ∞ mm |
| Distal end | Outer diameter*2 | Φ6.0 mm | Φ6.0 mm | Φ6.0 mm | Φ6.0 mm | Φ6.0 mm |
| | Rigid distal end length*3 | 18.4 mm | 18.9 mm | 18.8 mm | 18.9 mm | 18.8 mm |

| Adapter name | | AT80S-IV96 | AT120S/NF -IV96 | AT120S/FF -IV96 | AT60D/60D -IV96 | AT60S/60S -IV96 |
|----------------------|---------------------------|------------|--------------------|--------------------|---------------------|--------------------|
| Product abbreviation | | 80S | 120SN | 120SF | 60/60D | 60/60S |
| 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 | 15 to ∞ mm | 1 to 25 mm | 3 to ∞ mm | 5 to ∞ mm | 4 to ∞ mm |
| Distal end | Outer diameter*2 | Φ6.0 mm | Φ6.0 mm | Φ6.0 mm | Φ6.0 mm | Φ6.0 mm |
| | Rigid distal end length*3 | 24.2 mm | 24.2 mm | 24.2 mm | 24.9 mm | 31.3 mm |

- *1 Indicates the range within which the image can be viewed clearly.
- *2 Can be inserted into a Φ6.0 mm hole when mounted on the insertion tube.
- *3 Indicates the length of the rigid portion at the insertion tube's distal end when mounted.

Appendix

System chart



Carrying case



- - - - - RX/RT main unit - - - - -
- | | |
|----------------|----------------|
| 4-mm type (RX) | 6-mm type (RX) |
| • IV9420RX | • IV9620RX |
| • IV9435RX | • IV9635RX |
| | • IV9650RX |
| 4-mm type (RT) | • IV9675RX |
| • IV9420RT | |
| • IV9435RT | 6-mm type (RT) |
| | • IV9620RT |
| | • IV9635RT |
| | • IV9650RT |
| | • IV9675RT |
- * The LCD monitor is covered by a LCD protection sheet.
* The distal end is covered with a tip cap.

