

INSTRUCTIONS

IPLEX NX

INDUSTRIAL ENDOSCOPE

IV9000N

IV9435N

IV9450N

IV9635N

IV9635X1N

IV9650N

IV9675N

Industrial Endoscope

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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 instruction manual contains the information to understand the operations and handling method of this instrument and to use this instrument safely. Before using the instrument, carefully read the contents of this instruction manual to ensure that you use the instrument correctly. After reading this instruction manual, store it together with the warranty agreement in a safe place. If you have any questions about any information in this instruction manual, please contact Evident.

The symbols used in the texts of this manual have following meanings:
[] indicates the words on the user interface of the product displayed in English.
< > indicates the words on the user interface of the product and the language displayed is selectable by user settings.


Product configuration


For the configuration of devices required by this instrument and devices that can be used in combination with it, see "System chart" (page 122) in "Appendix". Note that use of this instrument in combination with options or separately available items other than "System chart" does not only create the risk of abnormal operations but it may also damage the device.


Safety precautions


Note that use of this instrument in ways that are not specifically described in this instruction manual does not ensure the safety and it may also cause the malfunction of this instrument. Be sure to follow this instruction manual when using this instrument.

The following symbols are used throughout this instruction 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.

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

 **TIP** : Indicates additional helpful information.

Safety precautions - General safety precautions -

Comply strictly with the precautions described below when handling this instrument. The information is supplemented by dangers, warnings and cautions given in each chapter. The safety cannot be ensured when the instrument is used in ways that are not specifically described.

DANGER

- **Never use the instrument for observing inside of the human or animal cavity.** Otherwise, death or serious injury of the person or animal may result.
- **Never use the instrument in the following 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 remodel the instrument.** Never repair, disassemble or remodel the instrument. Otherwise, the injury of human bodies or the damage of the instrument may result. Only personnel who are authorized by Evident are allowed to repair the instrument. Evident is not liable for any accidents or instrument damage that occurs as a result of repairs attempted by personnel who are not authorized by Evident.
- **Stop using the instrument immediately at the first sign of heat, smoke, abnormal odor, abnormal noise or any other abnormality.** Even if the instrument is still operable, turn OFF the power.
- **Do not insert the insertion tube into an inspection object that is in operation or conducting electricity.** Otherwise, the insertion tube may be damaged by being caught inside of the inspection object, etc., or the insertion tube may touch the object, which results in electric shock.

⚠ WARNING

- **Before storing the instrument in its carrying case, be sure to turn OFF the power and remove the battery.**

Leaving the battery loaded during storage causes it to be hot, which may cause fire.

⚠ CAUTION

- **Do not use the instrument in any environment (including strongly radioactive environments) other than the specified operating environment.**

Otherwise, unexpected accidents that may damage the insertion tube may result.

- **Do not touch the distal end immediately after using this instrument in high-temperature environments.**

Otherwise, you may get burned.

- **Use the stereo optical adapter and the scope unit in combination specified by Evident.**

If you use them in combination that is not specified by Evident, the unexpected accidents that may deteriorate the performance may result.

- **Use only the power cord and the AC adapter specified by Evident and connect the power cord to the 3P power outlet within the rated range.**

Otherwise, smoke, fire, or electric shock may occur.

- **Do not use the power cord specified for this instrument for other products.**

- **Do not use the AC adapter outdoors.**

Otherwise, electric shock, smoke or fire may occur, which may cause damage to the instrument.

The AC adapter is designed for indoor use.


- **Do not apply a strong impact to the AC adapter by hitting it against the wall or dropping it to the floor, etc.**

Otherwise, malfunction or damage may be caused and result in electric shock.

- **If you sense any abnormality while inserting the insertion tube into the inspection object, do not attempt to insert it forcibly any more but carefully pull out the insertion tube.**

Note the following when pulling out the insertion tube.

- Do not pull out the insertion tube from the inspection object while the angulation is locked or while the angulation section is bent.
- If the insertion tube is caught on something during pulling it out, rotate the insertion tube gently while continuing to pull out.

 CAUTION

- **Note the following precautions when handling the distal end of the insertion tube.**
 - Do not drop the optical adapter or subject it to strong impact.
 - Do not subject the distal end to severe impact or pulling.
 - Do not subject the angulation section to strong pressure or bending.
 - Do not move with holding the distal end of the insertion tube.
 - Do not use this instrument if the O-ring of the distal end of the insertion tube is damaged or torn.

Otherwise, the glass lenses and the precision components which constitute the distal end and the angulation section may be damaged.
- **Always attach the optical adapter before using this instrument.**

If you use the instrument without attaching the optical adapter to the insertion tube, parts (screws, etc.) are easily deformed due to contact with hard objects, etc. If the insertion tube parts are deformed, the optical adapter cannot be attached or may fall off.
- **Never use the optical adapter if any of its parts are loose.**

Otherwise, the loose parts may fall off.
- **If the optical adapter cannot be attached or removed because the nut does not rotate, stop using it.**

Contact Evident.
- **If you sense any abnormality while performing the angulation operation, do not attempt to force the angulation operation.**

Otherwise, the insertion tube or the inspection object may be damaged.
- **When hanging the main unit on your shoulder using the shoulder strap, do not allow it to be caught on other objects.**

Be careful so that it does not strangle your neck.
- **Do not allow metal or other foreign objects to enter the main unit through connector terminals or any other openings.**

Otherwise, the malfunction or electric shock may result.
- **Do not use this instrument near the strong electromagnetic radiation source.**

The proper operations may be interfered. Check the electromagnetic environment before using this instrument.
- **The interfaces in the connector cover, SDHC card and USB flash drive are high sensitivity parts. Be sure to remove the electricity before use.**

Otherwise, the malfunction may occur due to the static electricity.
(Caution plate position: "■ Caution 2" on page 11)
- **Remove the electricity around the heat sink of the main unit before operation.**

Otherwise, the malfunction may occur due to the static electricity.
(Caution plate position: "■ Caution 5", "■ Caution 7", "■ Caution 8" and "■ Caution 9" on page 11)
- **Do not use the parts other than the insertion tube underwater or clean them under running water.**

Otherwise, water creates the risk of electric shock. The parts other than the insertion tube are designed for water proof construction only if the battery cover and connector covers are closed completely. Do not use or store the instrument in an environment where it is submerged in water.

⚠ CAUTION

- **Do not subject the LCD monitor to strong impact, strong pressure or to scratching by a hard or pointed object.**
Otherwise, the LCD monitor may be cracked or scratched, or the damaged monitor may cause personal injury.
- **When tilting the handle, be careful not to pinch your hands or any objects.**
- **Use SDHC card and microSDHC card recommended by Evident to record images.**
This instrument comes with an SDHC card.
- **Do not remove the battery or the AC adapter during operation.**
Otherwise, the recorded data may be damaged.
- **Do not remove the SDHC card or the USB flash drive while recording or replaying the image.**
Otherwise, the recorded data or the image recording media may be damaged or lost.
- **Do not repeat inserting or removing the SDHC card or the USB flash drive continuously.**
Otherwise, the recorded data or the image recording media may be damaged or the SDHC card may not work properly.
- **Be careful for followings when using the extendable handle of the carrying case.**
 - Be careful you do not catch your hand when storing the handle inside the carrying case.
 - Do not attempt to lift the carrying case by holding the extendable handle.

NOTE

- **Do not store the instrument in the following locations.**
 - Environments exposed to high temperature, high humidity and large amounts of dust or particulate
 - Locations exposed to direct sunlight or radiation
 - Locations exposed to gas that includes halide^{*1}

Otherwise, the instrument may be damaged.

^{*1} The performance of some electrical parts may deteriorate due to the halide in insecticides, pesticides and gaseous extinguishing agents, etc.
- **Do not continue to use the instrument when it is wet with condensation.**
In case of a sudden temperature change, such as entering a warm room from cold outside, condensation may be caused inside the instrument. Using the instrument while it is wet with condensation may cause malfunction. If condensation occurs, leave the instrument in the environment where it will be used and allow the condensation to dry before using it.
- **Do not insert the insertion tube into the inspection object which is in an environment that exceeds the operating temperature range.**
The continued use may damage or deteriorate the performance of the instrument.
- **Do not use the instrument if the contaminants are attached to the outer surface of the instrument.**
The instrument may be damaged or the performance may be deteriorated.
- **Do not cover the main unit with a plastic bag or other objects.**
The inside of the instrument may not be cooled down sufficiently, which may damage the instrument.

NOTE

- **Do not allow any liquids other than water, saltwater, machine oil or diesel oil to be attached to the insertion tube.**
Otherwise, the insertion tube may be damaged.
- **Note the following precautions when handling the battery cover and the connector cover.**
 - Do not open or close covers with your wet hands.
 - Do not open or close covers in the area exposed to high humidity and/or dust.
 - Close covers when storing the instrument and when the terminals are not in use.
- **Note the following precautions when taking out the instrument from the carrying case.**
 - When taking out the scope unit or the main unit, do not hold it up with the insertion tube.
The instrument may be damaged.
- **Note the following precautions when storing the instrument in the carrying case.**
 - Make sure that the distal end has cooled down sufficiently before storing it.
- **When taking out the scope unit from the scope case, do not hold it up with the insertion tube.**
- **Note the following precautions when storing the scope unit in the scope case.**
 - Make sure that the distal end has cooled down sufficiently before storing it.
 - Store the scope unit in the scope case with the insertion tube wound around the drum.
- **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.



Safety precautions - Cyber security precautions -

CAUTION

- **Make security settings when using the network.**
Install the firewall or the intrusion detection/prevention system to take the measures for preventing unauthorized access from outside. Evident is not liable for any damage suffered by customers due to unauthorized access from outside.
- **Do not disclose the password to those other than users.**
Please do not disclose the password to those other than users. Evident is not liable for any information leakage, etc. that occurs as a result of failing in meeting this condition.
- **When disposing of or transferring this instrument, delete all information recorded in this instrument.**
In order to prevent abuse of information, delete the recorded information according to procedures described in "8-5 Initializing the network information" before disposing of or transferring this instrument.

Safety precautions - Hook assembly precautions -

Comply strictly with the precautions described below when handling the hook assembly. Before use, thoroughly read the inspection manual for the inspection object to fully understand the information contained in them, and observe their instructions during use.

WARNING

When replacing the hook:

- **Do not reuse the hook removed from the spring shaft.**
Otherwise, the hook may fall off.
- **As the hole in the hook is not threaded, it may be hard to screw the hook into the spring shaft. However, keep screwing the hook until it contacts the hook butting position in the spring shaft.**
Otherwise, the hook may fall off.
- **Do not screw the hook furthermore after the hook contacts the hook butting position in the spring shaft.**
Otherwise, the hook and the screw thread of the spring shaft may be damaged. Also, the hook may fall off.
- **Once the hook is attached to the spring shaft, do not loosen the hook.**
Otherwise, the hook may fall off.
- **If you loosened the hook, remove that hook and replace it with a new hook.**
Otherwise, the hook may fall off.
- **If you cannot screw the hook or if the hook falls off extremely easily, replace the hook assembly with a spare hook assembly.**
Otherwise, the hook may fall off.

When inserting the hook assembly into the channel of the scope unit and when using the hook assembly:

- **Keep your face away from the ends of the hook assembly.**
Your eyes may be poked by the ends of the hook assembly.
- **Do not insert any tool that is not specified by Evident into the channel.**
The tool may not be pulled out or the loose parts of the tool may fall off.
- **Attach the safety cap to the proximal end of the hook assembly before using the scope unit.**
Your eyes may be poked by the proximal end of the hook assembly.
- **Use the hook assembly only for the portion described necessary in the inspection manual for the inspection object in compliance with descriptions in the inspection manual for the inspection object.**
Otherwise, the failure such that the hook may fall off and drop on the inspection object to damage the inspection object, etc. may result.

Safety precautions - Battery precautions -

If you experience any problems when using this instrument with batteries, contact Evident. Comply strictly with the precautions described below when handling the battery. If the batteries are handled improperly, the battery fluid leakage, excessive heat generation, smoke, battery burst, electric shock and/or burns may result.

Before use, thoroughly read the instruction manual provided with the battery charger to fully understand the information contained in them, and observe their instructions during use.

DANGER

- **Use the battery NP-L7S and the battery charger JL-2Plus.**
(Caution plate position: ■ Caution 3" on page 11)
- **Do not allow terminals to be short circuited.**
- **Do not solder the battery directly to the terminal.**
- **Do not interconnect the electrodes of the battery with metal, or carry or store the battery together with metal necklaces, hair pins or other metal objects.**
- **Do not connect the battery directly to the power outlet or the cigar lighter socket of an automobile.**
- **Do not immerse the battery in fresh water or sea water, or allow the battery to get wet.**
- **Do not throw the battery into fire or subject it to heat.**
- **Do not 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 in an area exposed to direct sunlight, in a closed automobile in the sun, or near a heater, etc.**
- **If the fluid leaking from the battery enters your eyes, the loss of sight may result. In this case, wash your eyes with tap water or other clean water without rubbing and visit a physician immediately.**
- **Do not use the battery charger outdoors.**

Otherwise, electric shock, smoke or fire may occur, which may cause the damage to the charger. The battery charger is designed for indoor use.

WARNING

- **Do not cover the battery charger with clothing, bedding or other materials while charging.**
- **When the charging is complete, always unplug the power plug of the battery charger from the power outlet.**
- **If you sense the heat generation, abnormal odor, abnormal noise, smoke, or any other abnormality, unplug the power plug of the battery charger immediately and stop using it.**
Contact Evident.
- **If the battery charger does not complete recharging the battery in the specified recharging time, stop attempting to recharge the battery.**
- **Do not use a battery if it shows any irregularity such as fluid leak, discoloration, deformation, abnormal odor or other abnormality.**
Immediately request the repair service.
- **If the battery fluid gets onto your skin or clothing, immediately wash away with tap water or other clean water.**
Otherwise, a skin injury may result. Contact a physician for treatment if necessary.

⚠ WARNING

- **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.**
If any foreign object enters the main unit, remove the battery and disconnect the AC adapter, and immediately contact Evident.
- **Do not remove the battery immediately if the instrument was used continuously for a long time.**
The heat generated by the battery causes the risk of burn injury.
- **Do not leave the battery in a location subject to moisture, water leakages or extremely high or low temperatures.**
- **Do not touch the battery terminals with your wet hands.**
- **If you plan not to use the instrument for a long time, remove the battery from the main unit and store it in a dry place.**
Otherwise, the battery fluid may leak and the heat generation may result in a fire or injury.
- **Keep the battery out of the reach of small children.**

⚠ CAUTION

- **If you are experiencing problems in inserting the battery, do not attempt to insert it forcibly.**
Check the orientation of the battery and check the terminals for abnormalities. Attempting to insert the battery forcibly into the compartment may cause malfunction.
- **If you are experiencing problems in removing the battery from the instrument, do not attempt to remove it forcibly.**
Contact Evident.
- **Contact the airlines in advance if you plan to transport the battery by aircraft.**
- **When replacing the battery, do not repeat inserting or removing it rapidly.**
Otherwise, the power may not be turned ON.
- **When disposing of a battery, be sure to do so in accordance with all local laws, rules, and regulations.**
Before disposing of batteries, check your local laws, rules, and regulations and follow them accordingly.

NOTE

- The contamination of battery electrodes with sweat or oil will cause the contact failure. If the battery is dirty, wipe it with a dry cloth before use.
- Use the battery correctly. If the battery is used incorrectly, battery fluid leakage, heat generation or damage may result. Insert the battery in the correct orientation when replacing it.
- 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 the temperature exceeding the temperature ranges described above will result in degradation of its performance and service life. Before storing the instrument, be sure to remove the battery from the main unit.

Safety precautions - Illumination light precautions -


This product is equipped with high intensity illumination in order to obtain sufficient brightness for observing the inspection object. When the illumination of this product is turned ON, the intense light comes out from the distal end of the insertion tube of the scope unit. Comply strictly with the precautions described below when using this product.

CAUTION

- **Turn OFF the illumination if not necessary.**
If the illumination light enters your eyes, your eyes may get injured. If you see the illumination light for a long time even though it is at the edge of your field of view, your eyes may get injured.
If there is any possibility that the illumination light enters human eyes, turn OFF the illumination if not necessary.
In particular, be careful the illumination turns ON automatically in the following cases.
 - When you turn ON the power while the optical adapter is attached.
 - When you attach the optical adapter while the power is turned ON.
- **Do not see the illumination light.**
Otherwise, your eyes may get injured. If you see the illumination light for a long time even though seeing it diagonally or from the side, your eyes may get injured.
- **Do not see the light reflected from the illumination light.**
The light reflected from the illumination light may be collected depending on the shape of the reflection surface. If such reflected light enters your eyes, your eyes may get injured.
- **If there are people around you, call attention according to the precautions described in this page.**
People around you may get eye injury.
- **Do not leave the distal end of the insertion tube keeping its illumination turned ON near the flammable substances for a long time.**
Otherwise, fire may result.

Information of IEC62471

- RISK GROUP2

 **CAUTION:** Possibly hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to the eyes.

TIP

This product uses the fluorescence (white light) emitted from the phosphor excited by the laser beam as a illumination light. The laser beam is not emitted from this product.

Rating plate/caution plate

The safety ratings, cautions, and serial numbers are described on the label attached to this product.

Study the meaning of the safety symbols and always use the product in the safest possible manner.

Symbol	Meaning
	Indicates a non-specific general hazard. Follow the descriptions given after this symbol or in the instruction manual.
	Indicates that the distal end of the insertion tube is hot and should not be touched with bare hands. It may cause burns.
	Indicates that the laser beam is applied. Take special care in handling.

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

Base unit

■ Caution 4

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.

■ Caution 5

■ Caution 6

LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT

レーザー放射
ビームを覗かないこと
クラス2 レーザ製品

REVENANCEMENT LASER
NE PAS REGARDER DANS LE FAISCEAU
APPAREIL A LASER DE CLASSE 2

激光放射
直射を避けること
2 类激光产品

Model No. IV9 400 - 700nm
IEC60825-1:2014
EN60825-1:2014/A11:2021
GB7247.1:2012 JIS C 6802:2018

This product complies with 21 CFR 143.10 and 143.11
except for performance with IEC 60825-1 Ed. 2, as
described in Laser Notice No. 55, dated May 6, 2015.

■ Rating, Caution 1

AC Adapter 10V ≍ 40W
Battery 14.0V ≍ 40W

INDUSTRIAL ENDOSCOPE
TYPE: IV9-REU
INPUT

SHIMADZU MEDICAL CO., LTD.
SHIMADZU-KU Tokyo
162-8616, Japan

OLYMPUS CORPORATION
MADE IN JAPAN

■ Caution 2

■ Caution 3

■ Model name, serial number

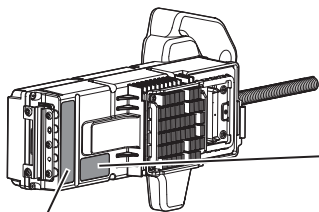
MODEL IV9***N
Serial# Y*****

■ Caution 7

■ Caution 8

■ Caution 9

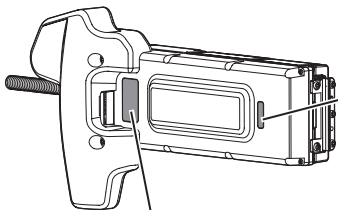
Scope unit (optional)



■ Conformity label



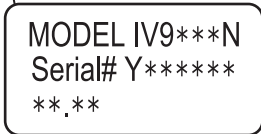
■ Caution



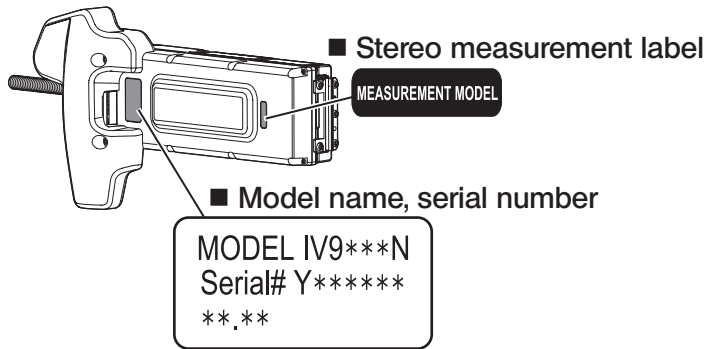
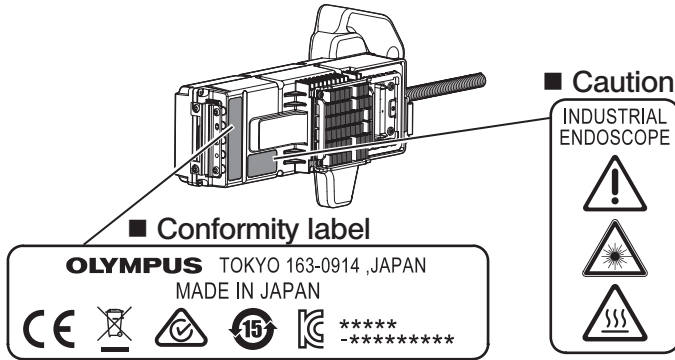
■ Label without description



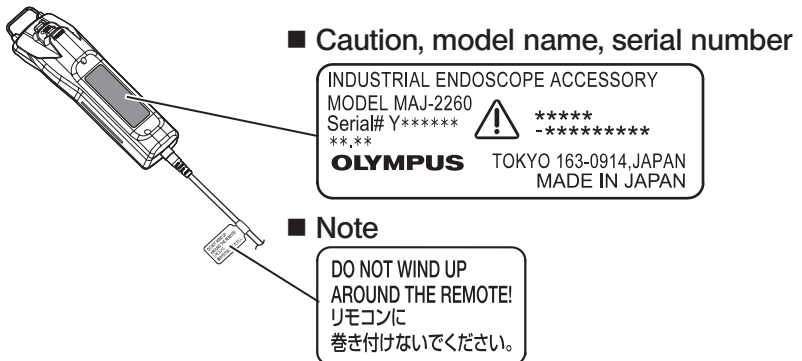
■ Model name, serial number



Stereo scope unit (optional)



Remote control unit (optional)



1 Unpacking

1-1 Unpacking

When unpacking, make sure that all items listed below are included. If anything is missing or damaged, contact Evident.

Name	Quantity
Base unit*	1
Image recording media (SDHC card)	1
AC adapter	1
Scope stopper	1
LCD holding bracket	1
Shoulder strap	1
Instruction manual	1
Carrying case	1

* For procedures to store the instrument in the carrying case, refer to the label which describes the storing procedures, attached to the inner surface of the top lid of the carrying case.

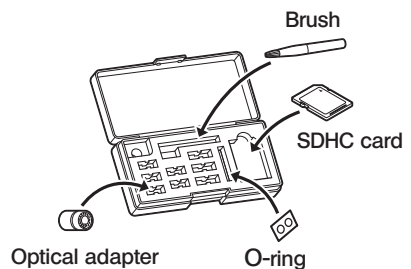
1 Storing the optical adapter case

The following items can be stored in the optical adapter case provided with the optional scope unit or the optional stereo scope unit.

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

Store these items in the optical adapter case when they are not in use.

The figure on the right shows the locations to store each item.



2 Options

• Scope unit

Name	Quantity
Scope unit	1
Drum	1
Optical adapter case	1

Name	Quantity
Lens cleaning kit (cotton swab, brush)	1
Instruction manual	1
Model number identification sticker	1

• Stereo scope unit

IV9●●●N (●●● indicates the scope diameter and the length.)

Name	Quantity
Scope unit	1
Drum	1
Optical adapter case	1
Lens cleaning kit (cotton swab, brush)	1
Instruction manual	1
Model number identification sticker	1
Stereo measurement reference guide	1
Check tool	1
Check tool calibration certificate	1

Name	Quantity
(when using IV9●●●N-MD) • Forward-view stereo optical adapter	1
(when using IV9●●●N-MDS) • Forward-view stereo optical adapter • Side-view stereo optical adapter	1 1
O-ring (when using IV9●●●N-MD) (when using IV9●●●N-MDS)	6 12
Stereo optical adapter registration sheet	1

• Optical adapter

Name	Quantity
Optical adapter	1
O-ring	6
Instruction manual	1

※ For IV9635X1N, the following items are provided in addition to items provided with the scope unit. For IV9635X1N-MD or IV9635X1N-MDS, the following items are provided in addition to items provided with the stereo scope unit.

Name	Quantity
Hook assembly	2
Hook	6
Hook assembly case	1

Name	Quantity
Safety cap (spare)	1
Channel port grip	1
Belt clamp	1

IV9635X1N, IV9635X1N-MD or IV9635X1N-MDS can be used with the software version 1.40A or later of this product.

If you are using the version earlier than 1.40A, download the latest software from the following URL and update the software in use.

<https://www.olympus-ims.com/en/service-and-support/downloads/>

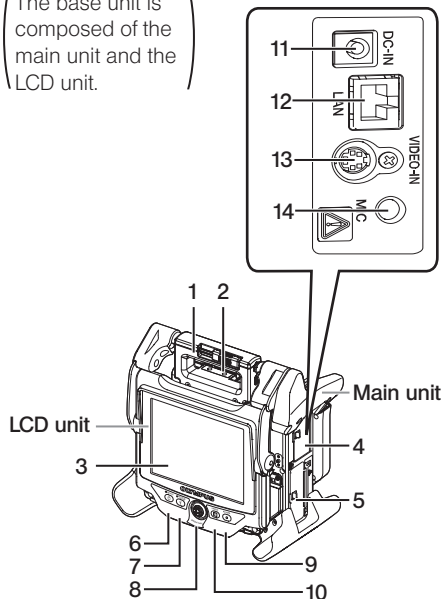
Refer to "System chart" (page 122) for information on other options.

2 Nomenclature

2-1 Nomenclature

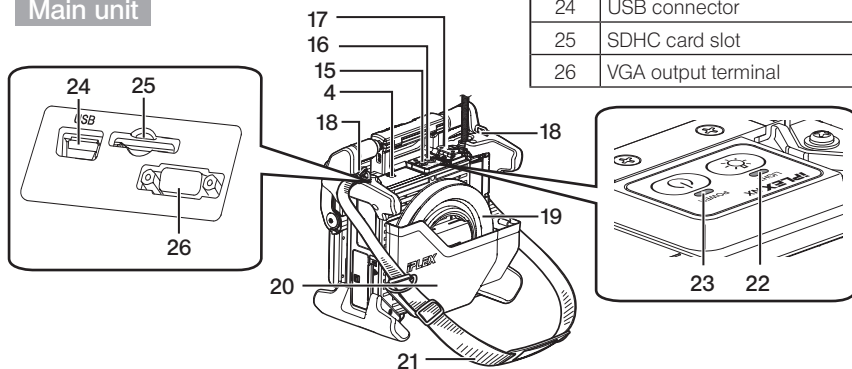
Base unit

(The base unit is composed of the main unit and the LCD unit.)

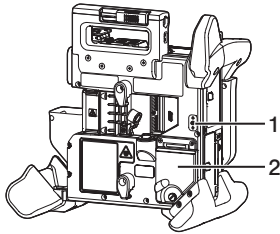


No.	Name
1	Handle
2	LCD unit handle fixing lever
3	LCD monitor
4	Connector cover
5	Battery cover
6	[ROTATE] button
7	[ANGLE SEL/CENTER] button
8	[ANGLE/LOCK] joystick
9	[RECORD] button
10	[FREEZE] button
11	DC-IN terminal
12	LAN port
13	External video input terminal
14	Microphone input terminal
15	[POWER] button (⏻)
16	[LIGHT] button (💡)
17	Latch
18	Strap bracket
19	Drum
20	Drum case and remote control unit holder
21	Shoulder strap
22	[LIGHT] indicator
23	[POWER] indicator
24	USB connector
25	SDHC card slot
26	VGA output terminal

Main unit

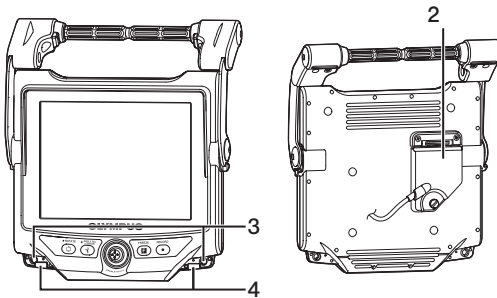


Main unit



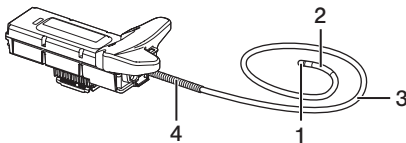
No.	Name
1	Cable stopper for Long LCD cable
2	LCD connector cover
3	Insertion tube holder
4	Hook for attaching remote control unit

LCD unit



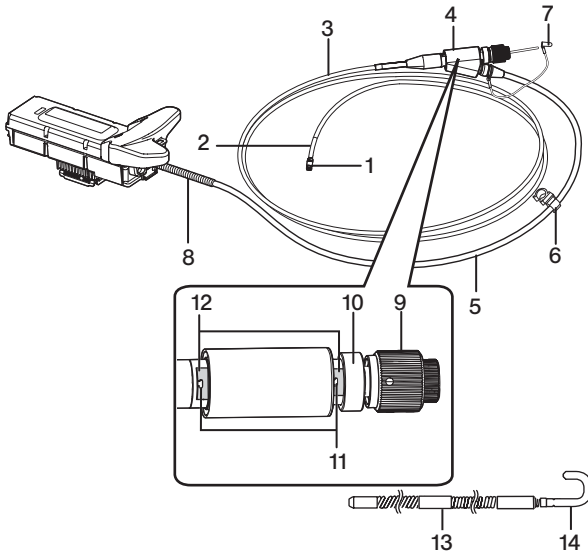
Scope unit

IV9●●●N, IV9●●●N-MD, IV9●●●N-MDS



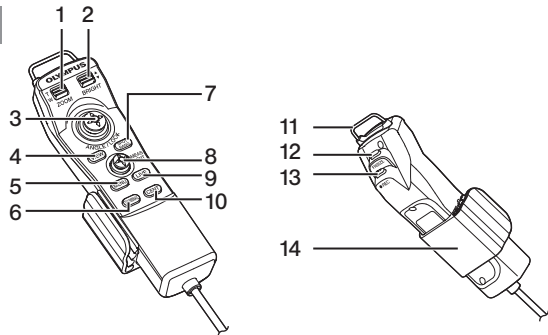
No.	Name
1	Distal end
2	Angulation section
3	Insertion tube
4	Scope strain relief

IV9635X1N, IV9635X1N-MD, IV9635X1N-MDS



No.	Name
1	Distal end
2	Angulation section
3	Insertion tube
4	Channel port
5	Universal cord
6	Handle holder
7	Safety cap
8	Scope strain relief
9	Chuck screw
10	Lock ring
11	Protrusions (two positions each on front and back sides)
12	Flat surface (two positions each on front and back sides)
13	Spring shaft
14	Hook

Remote control unit



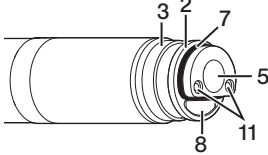
No.	Name
1	[ZOOM] lever
2	[BRIGHT] lever
3	[ANGLE/LOCK] joystick
4	[MEW] button
5	[MENU] button
6	[THUMBNAIL] button
7	[SPOT RANGING] button (Stereo measurement only)

No.	Name
8	[MEAS/ENTER] joystick
9	[LIVE] button
10	[CENT] button
11	Hanger for attaching LCD unit
12	[FREEZE] button
13	[RECORD] button
14	Insertion tube grip

2-2 Distal end/optical adapter nomenclature

4-mm type

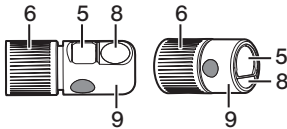
● Distal end



● Optical adapter, stereo optical adapter

Side-view

Forward-view

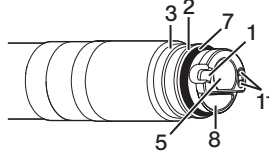


● Optical adapter internal view



6-mm type

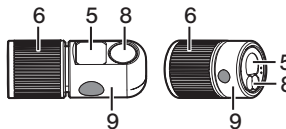
● Distal end



● Optical adapter, stereo optical adapter

Side-view

Forward-view

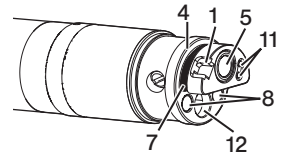


● Optical adapter internal view



6.2-mm type

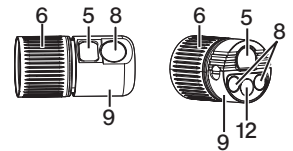
● Distal end



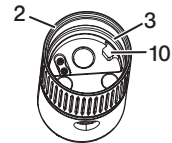
● Optical adapter, stereo optical adapter

Side-view

Forward-view



● Optical adapter internal view



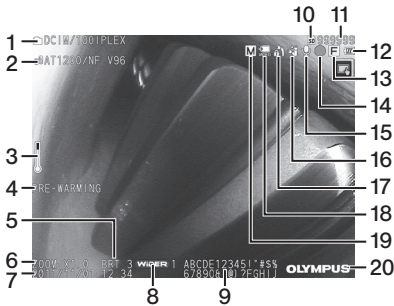
No.	Name
1	Optical adapter positioning groove
2	First screw thread
3	Second screw thread
4	Connecting screw thread
5	Objective lens
6	Nut
7	O-ring
8	Illumination

No.	Name
9	Product name abbreviation* and serial number (stereo optical adapter)
10	Positioning pin
11	Contact pins
12	Channel

* For information about the product name abbreviation, see "11-3 Optical adapter specifications" (page 120).

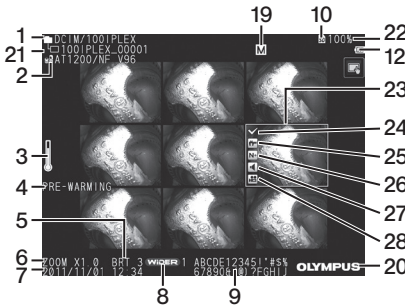
2-3 LCD monitor nomenclature

Live screen



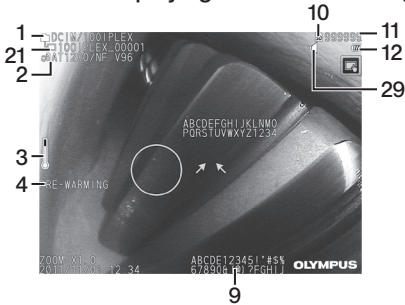
No.	Icon/Indicator	Name
1	-	Folder name
2	-	Optical adapter name
3		Distal end temperature indicator
4	PRE-WARMING	Warming-up icon
5	-	Brightness level
6	-	Zoom level
7	-	Date/Time
8		WIDER icon
9	-	Title
10		Media icon (SD or USB)
11	-	Number of recordable images
12		Battery indicator
13		Freeze icon
14		Recording movie icon
15		Recording sound icon
16		Angle centering icon
17		Angle lock icon
18		External input icon
19		Manual icon
20	-	Logo

Thumbnail screen

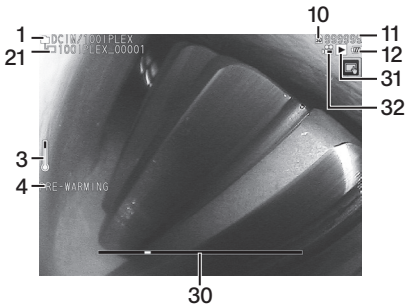


View screen

● When playing back the still image



● When playing back the movie



No.	Icon/Indicator	Name
1	-	Folder name
2	-	Optical adapter name
3		Distal end temperature indicator
4	PRE-WARNING	Warming-up icon
5	-	Brightness level
6	-	Zoom level
7	-	Date/Time
8		WIDER icon
9	-	Title
10		Media icon (SD or USB)
11	-	Number of recordable images
12		Battery indicator
19		Manual icon
20	-	Logo
21	-	File name
22	-	Remaining media capacity
23	-	Thumbnail selection frame
24		Mark
25		Measurement icon
26		Note icon
27		Sound icon
28		Movie icon
29		Playing back sound icon
30		Movie playback position bar
31		Movie playback status icon (Playing back, pause or end of playback)
32		Playing back movie icon

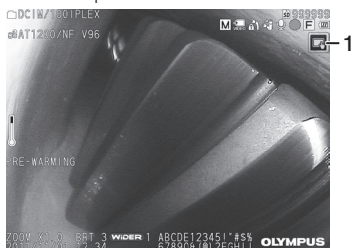
TIP

- The displayed title is the title that was entered on the live screen the last time the system was used.
- If you notice any dirt, stains, or other abnormalities on the LCD monitor, see "10 Storage and maintenance" (page 109).

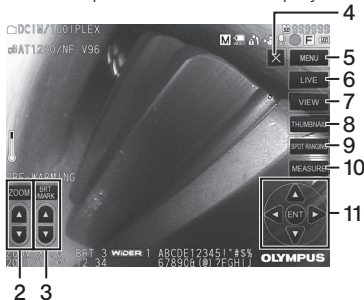
Touch panel

The buttons on the touch panel are displayed common in the live screen, thumbnail screen and view screen.

When touch panel buttons are hidden



When touch panel buttons are displayed



No.	Name
1	Touch panel buttons display button
2	[ZOOM] button
3	[BRT] button
4	Touch panel buttons hide button
5	[MENU] button
6	[LIVE] button
7	[VIEW] button
8	[THUMBNAIL] button
9	[SPOT RANGING] button
10	[MEASURE] button
11	[Move] button (up/down/right/left arrows) [ENTER] button (center)

3 Pre-operation preparation and inspection

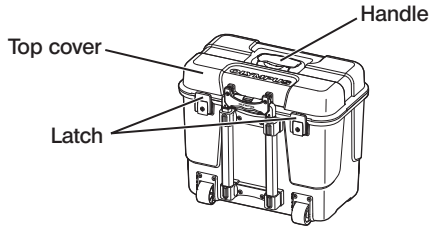
Be sure to perform the preparation and inspection described in this chapter before using the instrument. At the first sign of any abnormality, immediately stop using the instrument and perform the required actions as described in “9 Troubleshooting” (page 105). Inspections are not only required before use but also should be conducted periodically.

NOTE

Make sure that the power of the instrument is turned OFF before performing the pre-operation preparation and inspection.

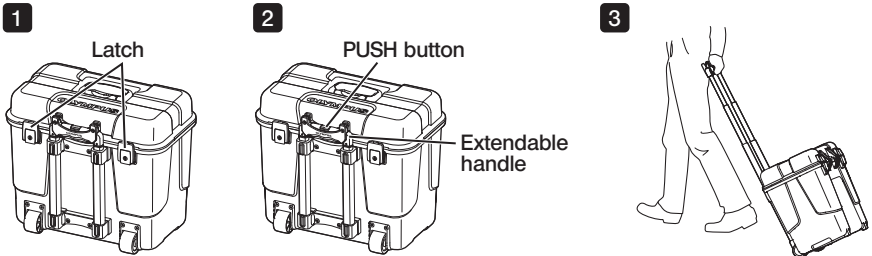
3-1 Transporting of the carrying case

■ When using the handle



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

■ Towing using the extendable handle

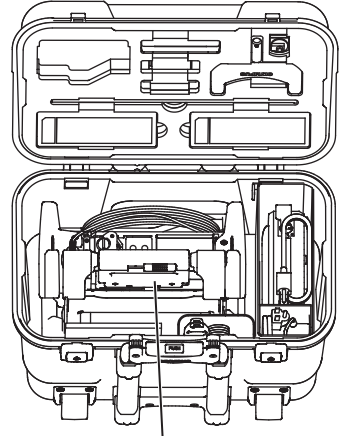


- 1** Make sure that the latch is completely closed.
- 2** Press the PUSH button to unlock the handle and then extend it. Press the PUSH button again to unlock the handle and then store it.
- 3** Hold the handle to lift one side of the carrying case and move it by rolling the wheels on the bottom of the carrying case along the ground.

3-2 Placing the instrument

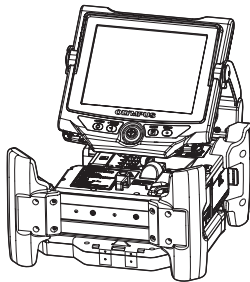
1 Removing components from the carrying case

Hold the handle to take out from the carrying case.

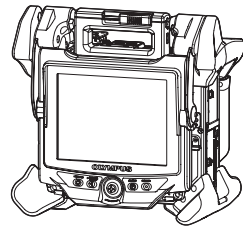


Handle

2 Placing the main unit on a flat surface



Horizontal orientation

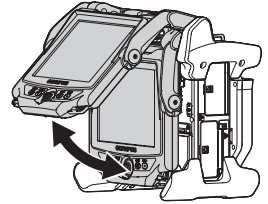


Vertical orientation

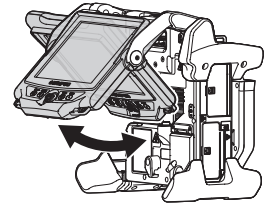
The main unit can be placed either in horizontal orientation or in vertical orientation. Place it on the stable location.

3 Adjusting the height and direction of the LCD unit

Press the cover of the handle and pull up the LCD monitor to adjust the height of the LCD monitor.



Rotate the LCD monitor around the attaching handle to adjust the direction.



4 Placing the LCD unit

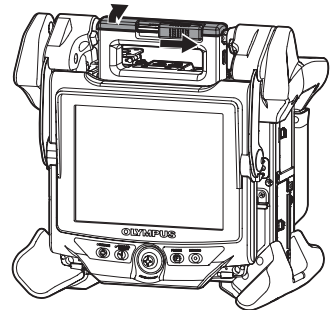
The LCD unit can be removed from the main unit and placed separately by using the long LCD cable (optional).

■ Removing the LCD unit

Slide the LCD unit handle fixing lever of the handle at the top of the main unit horizontally to open the cover of the handle.

Remove the LCD unit from the main unit.

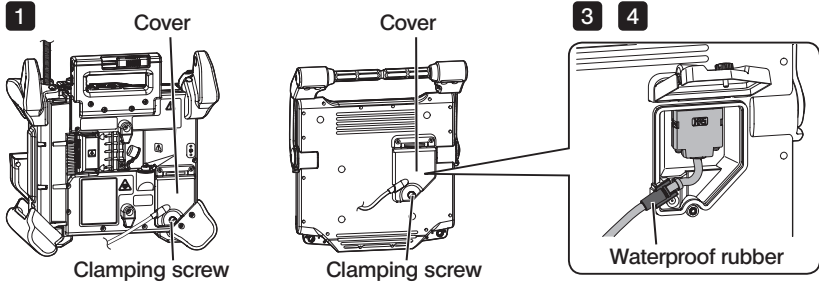
After the LCD unit is removed from the main unit, put the cover of the handle of the main unit back to the original place.



● Attaching the LCD unit

Attach the LCD unit in the reverse order of the attaching procedures.

■ Attaching the long LCD cable



- 1** Loosen the clamping screws of the LCD connector covers of the main unit and the LCD unit, and open the cover.
- 2** Remove the LCD cable from the main unit and the LCD unit.
- 3** Connect the long LCD cable to the main unit and the LCD unit.
- 4** Attach the waterproof rubber of the long LCD cable as shown above.
- 5** Close the LCD connector covers of the main unit and the LCD unit, and tighten the clamping screws.

NOTE

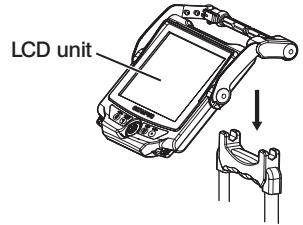
- Attach the waterproof rubber correctly and be sure to tighten the clamping screws of the covers. Otherwise, the water resistant proof may not be ensured.
- Be sure to turn OFF the power before removing or attaching the LCD cable or the long LCD cable.
Otherwise, the instrument may be damaged.

■ Placing the LCD unit only

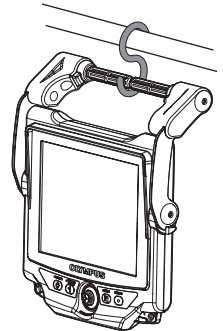
Remove the LCD unit from the main unit, attach the LCD unit to the handle of the carrying case and secure it.

NOTE

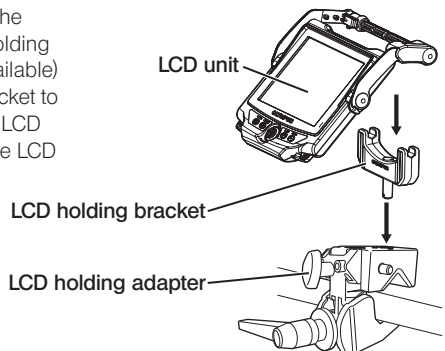
- **When adjusting the angle of the handle of the LCD unit, hold the handle of the carrying case to support the LCD unit firmly.**
Otherwise, the carrying case may fall down or the LCD unit may drop.
- **If using the main unit kept in the carrying case, do not close the cover of the carrying case.**
Otherwise, the cables may be caught between the carrying case and its cover.



When performing the observation by hanging the LCD unit, hook an S-hook or string, etc. to the handle and hang the LCD monitor.



When performing the observation by placing the LCD unit on the desk or so, secure the LCD holding adapter (made by Manfrotto /commercially available) on the desk or so. Attach the LCD holding bracket to the LCD holding adapter, and then, attach the LCD unit to the LCD holding bracket, and secure the LCD unit.



3-3 Preparing the power supply

1 Using the battery

■ Checking the remaining battery level (on battery)

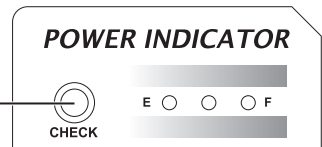
The remaining battery power can be checked on the [POWER INDICATOR] of the battery. (Note the remaining battery power shown on the LCD monitor is different from that shown on the [POWER INDICATOR].)

While the [CHECK] button is being pressed, LED (in 3 levels) that shows the charging status turns ON.

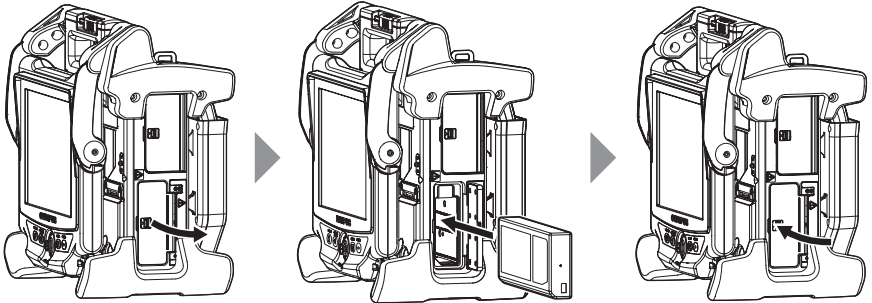
When ●●● lights: Almost fully charged.

When ● lights: Need recharge.

For details, refer to the instruction manual of the battery.



■ Loading the battery to the main unit



Open the battery cover.

Noting the orientation of the battery, insert it.

Make sure that the battery is locked and close the cover.

Confirm that the battery cover is locked completely.

TIP

- 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 is degraded as the ambient temperature drops. Note that the battery performance degraded due to the low temperature recovers when the temperature rises to a normal level.
- A full charge will provide approximately 100 minutes (in general) of continuous operation. The actual operating time depends on the charging method, operating environments or setting conditions of this instrument. It is recommended to prepare multiple spare batteries if long hours of battery-powered operations are expected. The normal battery charging time is approximately two hours and 30 minutes (in general).
- If the following message appears when you turn ON the power supply of this instrument, the battery is warming up. Use this instrument after this message disappears.

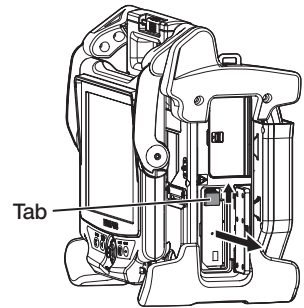
[PRE-WARMING]

TIP

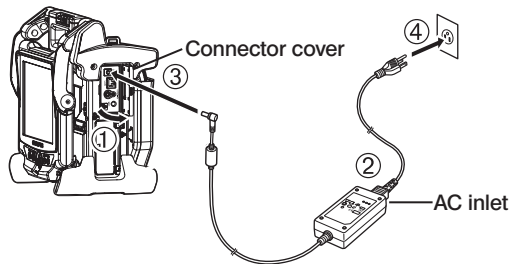
- The battery is a consumable item.
- The battery cannot be charged by this instrument. For information on charging the battery, refer to the instruction manual provided with the battery charger.

● Removing the battery

Remove the battery by raising the tab at the battery insertion slot.

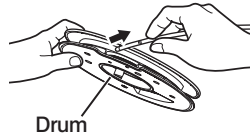


2 Using the AC adapter



- ① Open the connector cover on the side of the main unit.
- ② Connect the AC power cord to the AC inlet of the AC adapter.
- ③ Connect the output connector of the AC adapter to the DC-IN terminal of the main frame.
- ④ Connect the plug of the AC power cord securely into a 3P power outlet.

3-4 Taking out the insertion tube



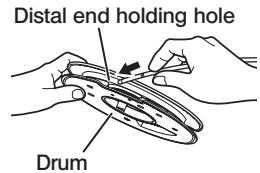
Remove the drum from the drum case of the main unit, and take out the insertion tube from the drum.

NOTE

- When taking out the insertion tube from the drum, hold the drum and take out the insertion tube.
- When taking out the insertion tube from the drum, do not apply the excessive force to the insertion tube.
Otherwise, the insertion tube may be damaged.

■ Storing the insertion tube

Insert the distal end of the insertion tube until it lightly touches the distal end holding hole, and wind the insertion tube around the drum.



NOTE

- When storing this instrument for a long period or transporting it, store the insertion tube in the drum.
- When inserting the distal end of the insertion tube to the distal end holding section, do not insert it with an excessive force.
Otherwise, the insertion tube may be damaged.
- Make sure that the insertion tube is not twisted before winding the insertion tube around the drum.

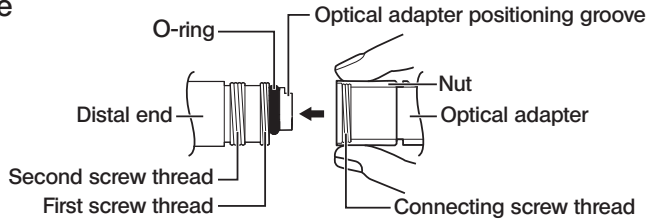
3-5 Attaching and removing the optical adapter

NOTE

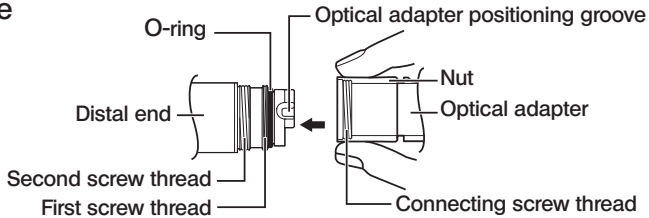
- **Be sure to attach the O-ring to the distal end of the insertion tube before using the optical adapter.**
Water getting into the area where the insertion tube and the optical adapter join may cause malfunction or damage. Also note that the optical adapter by itself is not watertight.
- **Never use the instrument while dirt or water is attached inside the optical adapter.**
Otherwise, the 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 Holding the optical adapter and the distal end so that they make one straight line each other, carefully insert the optical adapter into the distal end.

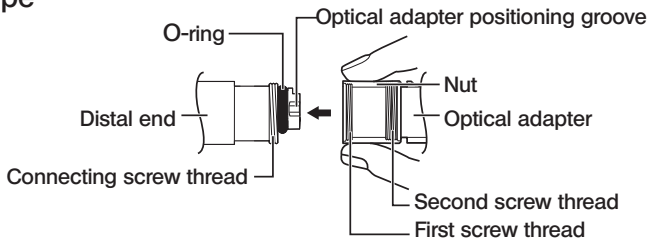
■ 4-mm type



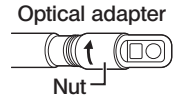
■ 6-mm type



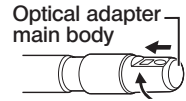
■ 6.2-mm type



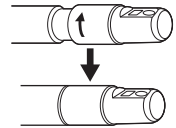
- 2 Rotate the nut of the optical adapter clockwise until the connecting screw thread passes over the first screw thread.



- 3 After passing the first screw thread, rotate the entire main body of the optical adapter clockwise while pushing gently until the optical adapter main body fits into the positioning groove of the insertion tube and stops rotating anymore.



- 4 Rotate the nut of the optical adapter clockwise to attach the connecting screw thread to the second screw thread. Tighten the nut until it stops completely.

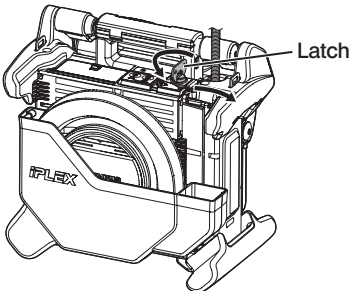


■ Removing the optical adapter

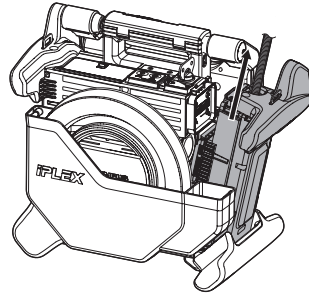
Remove the optical adapter in the reverse order of the attaching procedures.

3-6 Removing the scope unit

1



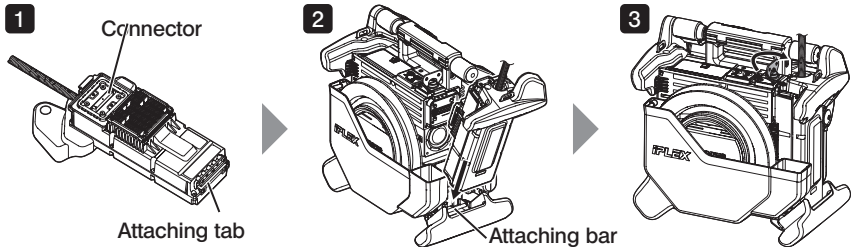
2



- 1 Rotate the latch at the top of the main unit counterclockwise to unlock it.

- 2 Remove the scope unit.

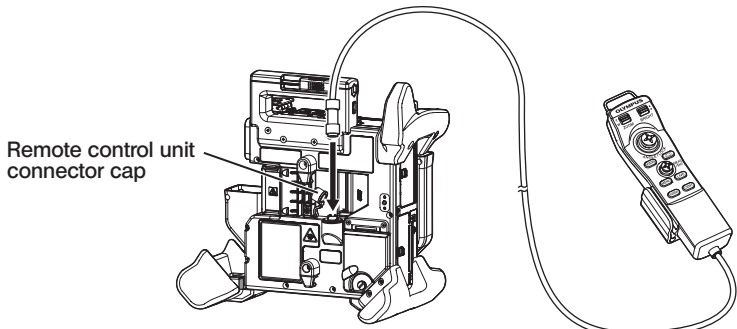
■ Attaching the scope unit



- 1 Check that the end surface of the connector is not dirty. If it is dirty, wipe it completely with the cotton swab provided with the lens cleaning kit.
- 2 Match the scope unit attaching tab with the main unit attaching bar, and attach the scope unit to the main unit.
- 3 Rotate the latch clockwise to lock it.

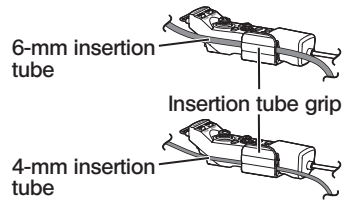
NOTE Be sure to turn OFF the power before removing or attaching the scope unit. Otherwise, the instrument may be damaged.

3-7 Connecting the remote control unit to the main unit



Remove the remote control unit connector cap of the main unit. Then, insert the connector of the remote control unit to the connector of the main unit, and rotate the connector of the remote control unit clockwise to connect the remote control unit.

TIP If necessary, attach the insertion tube grip to the remote control unit and put the insertion tube through the insertion tube grip. Grasping the insertion tube grip together with the remote control unit allows you to hold the insertion tube securely.



■ Removing the remote control unit

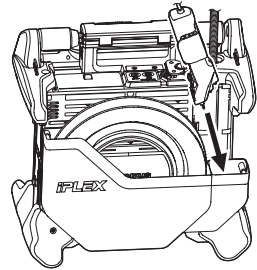
Remove the remote control unit in the reverse order of the connection procedures.

NOTE

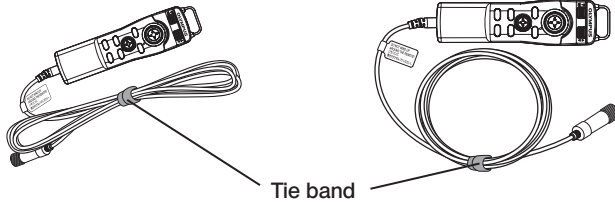
- Do not apply an excessive force to the connection section while the remote control unit is connected to the main unit.
- Be sure to turn OFF the power before removing or attaching the remote control unit. Otherwise, the instrument may be damaged.

■ Storing the remote control unit

Store the remote control unit in the remote control unit holder.



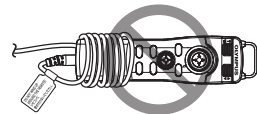
When storing, please bundle the cables with tie band as shown in the figure below.



NOTE

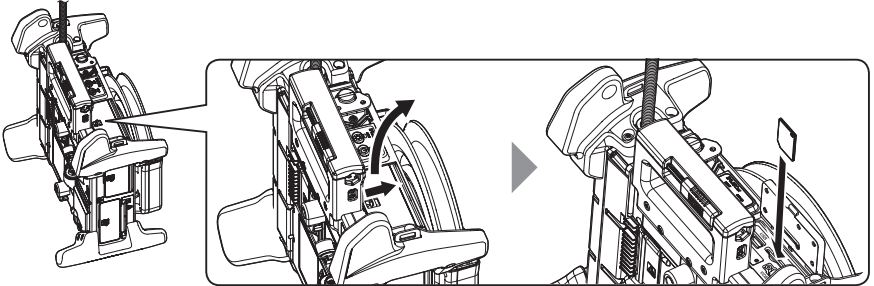
Do not wind up the cable around the remote control unit.

Otherwise, the excessive force may be applied to the cable, which may damage the cable.



3-8 Connecting the SDHC card/USB flash drive

■ Loading the SDHC card



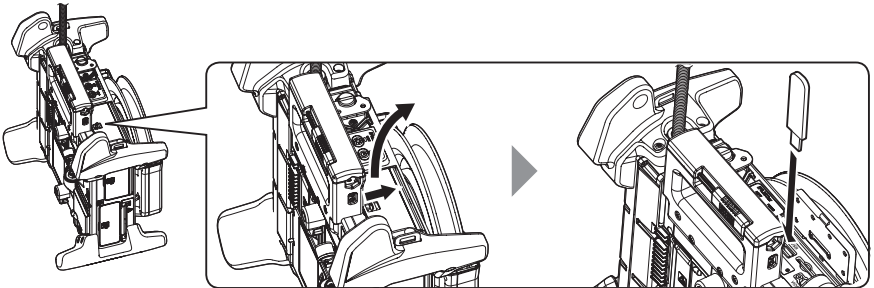
Open the connector cover.

Noting the orientation of the SDHC card, insert the SDHC card to the end until the “click” sound is heard. Then, close the connector cover.

● Removing the SDHC card

Push the SDHC card once to remove the SDHC card.

■ Loading the USB flash drive



Open the connector cover.

Insert the USB flash drive by noting its orientation.

TIP

Only still images can be recorded in the USB flash drive.

● Removing the USB flash drive

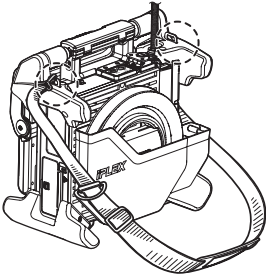
Hold the USB flash drive and remove it.

3-9 Attaching/removing the shoulder strap

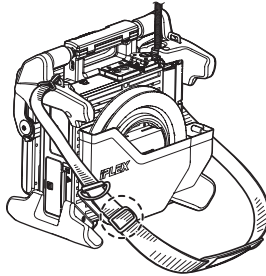
The shoulder strap lets you to carry the main unit easily on the shoulder.

■ Hanging the main unit on the shoulder

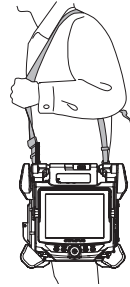
1



2



3



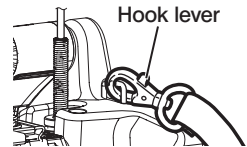
1 Attach the shoulder strap hooks to the two belt brackets.

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

3 Hang the shoulder strap on your shoulder and hold the shoulder strap firmly with your hand.

● Detaching the shoulder strap

To detach the shoulder strap, press the hook lever to remove the hook from the belt brackets.

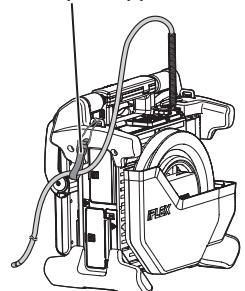


TIP

Attach the string of the scope stopper to the belt bracket, make a circle with the Velcro and put the insertion tube through it.

Restricting the movement around the base of the insertion tube enables to prevent the insertion tube from interfering the observations or operations with LCD monitor.

Scope stopper



3-10 Attaching the hook assembly

Insert the hook assembly from the channel of optical adapter as described below.

WARNING

For details, refer to “ Safety precautions - Hook assembly precautions-” (page 7).

- 1** Loosen the chuck screw on the channel port so that the hook assembly can be passed through it.
- 2** Straighten the scope's insertion tube as much as possible.
- 3** Slowly insert the hook assembly's proximal end into the channel of optical adapter.

NOTE

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

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

NOTE

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

- 5** Attach the safety cap to the proximal end of the hook assembly.

3-11 Replacing the hook

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

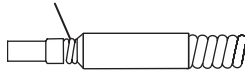
⚠ WARNING

For details, refer to “**⚠** Safety precautions - Hook assembly precautions-” (page 7).

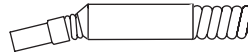
1 Check the screw thread at the distal end of the spring shaft.

If the end screws rattle or are misaligned, do not use the spring shaft and use a new hook assembly instead.

Distal end screw

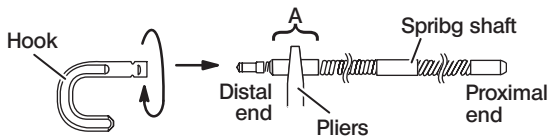


(Usable)

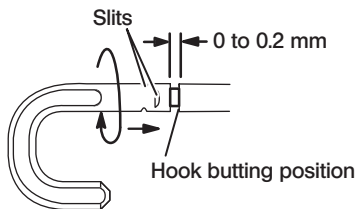


(Unusable)

2 While gripping A in figure below with pliers, push the hook straight over the spring shaft.



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

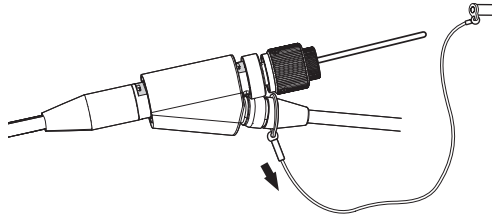


3-12 Replacing the safety cap

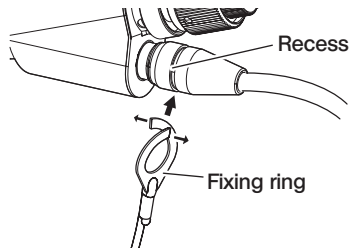
⚠ WARNING

For details, refer to “⚠ Safety precautions - Hook assembly precautions-” (page 7).

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

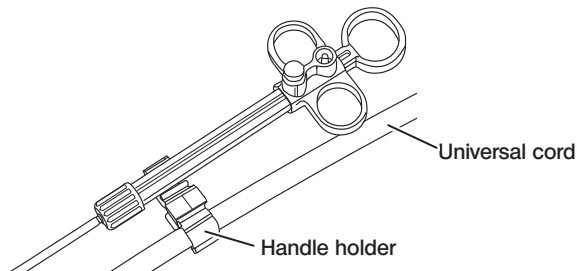


- 2 Open the fixing ring on the new safety cap, and attach to the universal cord in the recess shown in the following diagram.



3-13 Using the handle holder

You can hold the slider of retrieval tool to the universal cord of scope unit by using the handle holder.

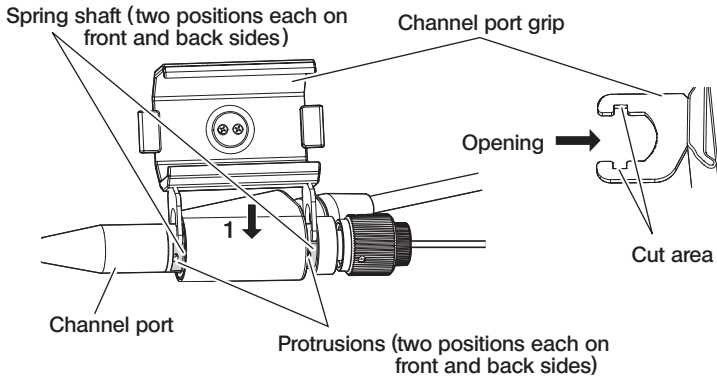


3-14 Using the channel port grip and the belt clamp

You can hold the channel port and the remote control unit securely with one hand by using the channel port grip.

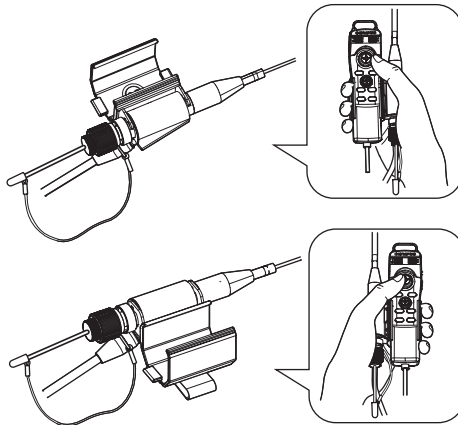
■ Attaching the channel port grip and the remote control unit

- 1 Insert the opening of the channel port grip all the way to the spring shaft of the channel port (arrow 1.). Attach the channel port grip so that the channel port grip does not collide with the protrusions of the channel port.

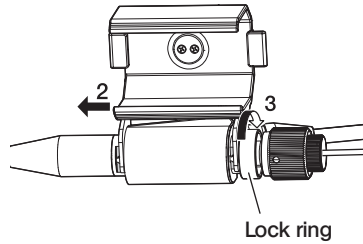


The above picture shows the case when the channel port grip is attached to the right side of the channel port.

The channel port grip can be attached to either the right or left side of the channel port shown in the pictures below.

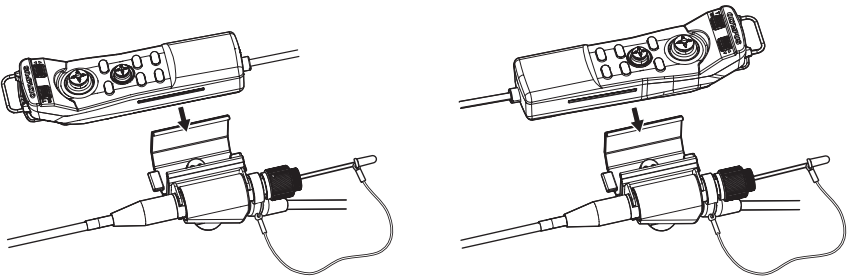


- 2** Slide the channel port grip in the direction of arrow 2.
This should accommodate the protrusions in the cut area.
- 3** Rotate the lock ring in the direction of arrow 3. to clamp the channel port grip. Confirm that it is attached firmly.

**NOTE**

If the channel port grip cannot be attached or removed because the lock ring cannot be turned, stop using the equipment and contact Evident.

- 4** Attach the remote control unit on the remote control unit mount of the channel port grip.
The remote control unit can be attached in either direction with respect to the channel port.



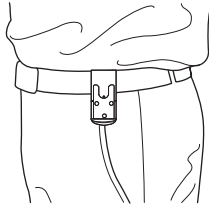
- **Removing the channel port grip and the remote control unit**

When removing the remote control unit and the channel port grip from the channel port, reverse the above steps.

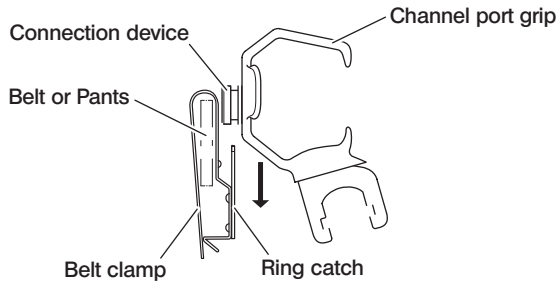
By using the belt clamp, you can secure the channel port and the remote control unit attached to the channel port grip to the side of your body.

■ Attaching the belt clamp and the channel port grip

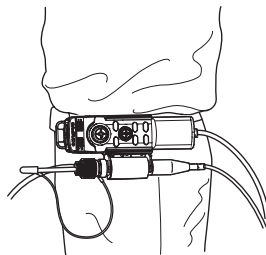
- 1 Attach the belt clamp to a belt or pants.



- 2 Push the connection device of the channel port grip into the ring catch of the belt clamp, until it clicks



- 3 Confirm the channel port grip is attached firmly.



● Removing the belt clamp and the channel port grip

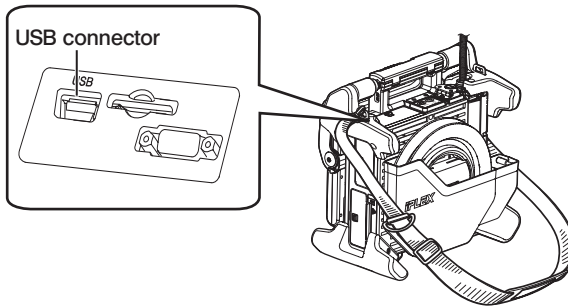
Remove the belt clamp and the channel port grip in the reverse order of the attaching procedures.

3-15 Attaching and removing the USB wireless LAN adapter

■ Attaching the USB wireless LAN adapter

Plug the USB wireless LAN adapter (recommended) into the USB connector.

For the recommended USB wireless LAN adapters, contact Evident.



■ Removing the USB wireless LAN adapter

Remove the USB wireless LAN adapter in the reverse order of the attaching procedures.

3-16 Pre-operation/post-operation inspections

NOTE

- 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 foreign substances such as dirt or sand attached to the remote control unit, LCD monitor, insertion tube or connector covers?	See "10 Storage and maintenance" (page 109).
	<input type="checkbox"/> Any cracks or scratches on the remote control unit, LCD monitor, insertion tube or connector covers?	Replacement required. Contact Evident.
	<input type="checkbox"/> Any irregularities such as damage to or deformation of the exterior materials, buttons, joysticks, or levers?	
	<input type="checkbox"/> Any irregularities such as tear or kinks on the remote control cable or LCD cables?	
<input type="checkbox"/> Any looseness in materials other than the angulation section?		
Insertion tube/ Angulation section/ Distal end	<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 "10 Storage and maintenance" (page 109).
	<input type="checkbox"/> Any build up of dirt on the optical adapter positioning groove or screw threads of the distal end?	
	<input type="checkbox"/> Any distal end deformation or looseness, or unusual wear of connecting screw thread? Never use the instrument while there is any looseness on the distal end. Otherwise, the loose parts may fall off.	
	<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.	
O-ring		

Inspection location	Item	If abnormality is discovered
Optical adapter, stereo optical adapter	<input type="checkbox"/> Any dirt or water droplets 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 "10 Storage and maintenance" (page 109).
	<input type="checkbox"/> Any deformities or foreign objects in the connecting screw thread of the optical adapter? Note that insufficient cleaning may 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, the loose parts may fall off.	
	<input type="checkbox"/> Did you check measurement values before and after the stereo measurement? (Stereo measurement only)	
LCD monitor	<input type="checkbox"/> Any surface cracks or other abnormalities on the screen? <div style="border: 1px solid black; border-radius: 15px; padding: 2px; display: inline-block; margin: 5px 0;">TIP</div> <hr style="width: 30%; margin: 5px 0;"/> <p>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.</p> <hr style="width: 30%; margin: 5px 0;"/>	Replacement required. Contact Evident.
	<input type="checkbox"/> Any fingerprints or other soiling on the screen?	
Carrying case	<input type="checkbox"/> Any damage, looseness or other irregularities on the exterior, handle, latch, or other parts of the carrying case?	See "10 Storage and maintenance" (page 109).
	<input type="checkbox"/> Are you using the designated carrying case? Use of a non-designated carrying case may create a risk of the insertion tube or main unit to be damaged or malfunctioned.	Contact Evident.
Battery	<input type="checkbox"/> Any fluid leakage, deformation, cracks or other abnormalities of the battery?	Contact Evident.

Inspection location	Item	If abnormality is discovered
Channel	<input type="checkbox"/> Any strong resistance in the hook assembly? Inserting the hook assembly into the scope forcibly may damage the scope unit and the hook assembly.	Contact Evident.
Channel port	<input type="checkbox"/> Any abnormal deformities or foreign objects in the chuck screw? Does the chuck screw rotate smoothly to clamp or release the hook assembly?	Contact Evident.
	<input type="checkbox"/> Is the safety cap attached securely?	See "3-12 Replacing the safety cap" (page 39).
Hook assembly	<input type="checkbox"/> Any irregularities such as buckling, stretching, part separation, crushing and excessive bending? Continued use in this condition may damage the hook assembly or the hook assembly may fall off.	Replace the hook assembly with a new one.

4 Basic operation

4-1 Turning ON the power

1 Turning ON the power

To turn ON the power, press the [POWER] button (⏻) of the main unit approx. one second. After pressing the [POWER] button (⏻) approx. one second, the [POWER] indicator lights up and the power turns on.

The display screen and menu operations become enabled approx. 35 seconds after the [POWER] button (⏻) is pressed.

TIP

If the optical adapter is attached, the light is turned ON automatically.

■ Turning OFF the power

Press the [POWER] button (⏻) of the main unit one second or longer.

When the system shuts down, the [POWER] indicator of the main unit and the indicator of the [ANGLE SEL/CENTER] button of the LCD monitor are turned OFF automatically.

If you are using the remote control unit, the illumination of the button is turned OFF automatically.

4-2 Turning ON the light

1 Checking the lighting of the illumination at the distal end of the insertion tube

The light intensity is adjusted depending on the brightness of the inspection object.

TIP

- Always turn OFF the [LIGHT] button (☞) of the main unit when the instrument is not in use, such as when replacing the optical adapter or attaching the hook assembly, etc.
- Attaching the optical adapter will turn ON the light automatically. And, removing the optical adapter will turn OFF the light automatically.

■ Turning ON/OFF the light manually


















Pressing the [LIGHT] button (☞) turns ON or OFF the light.


While the light turns ON, the [LIGHT] indicator lights on.

4-3 Operating the instrument

This instrument can be operated by the touch panel, buttons and joysticks of the LCD unit and the remote control unit (optional).

For operations using the LCD unit and the remote control unit, see the following table.

Touch panel of LCD unit	Remote control unit	Function	
	(No applicable button)	Shows the touch panel button.	
	(No applicable button)	Hides the touch panel button.	
	[MENU] button	Shows/hides the menu screen.	
	※ tap	[LIVE] button ※ short-press	Returns to the live screen.
	※ long-tap	[LIVE] button ※ long-press	Changes the brightness adjustment between Auto mode and Manual mode.
	[VIEW] button	Displays the image recorded. (Tapping this button while the view screen is displayed will show the live screen.)	
	[THUMBNAIL] button	Displays the thumbnail screen. (Tapping this button while the thumbnail screen is displayed will show the live screen.)	
	[SPOT RANGING] button	Starts/exits the spot ranging function. (Tapping this button while the spot ranging screen is displayed will show the live screen.)	
	[MEAS/ENTER] joystick (Press the button.)	Starts the stereo measurement function.	
	[ZOOM] lever	Uses the zoom function.  enlarges the image and  reduces the image.	
	[BRT] lever	Changes the brightness setting.  increases the brightness level and  decreases the brightness level.	
		Tapping  on the thumbnail screen will put a mark on the image being selected, and tapping  will put marks on all thumbnail images.	
	[MEAS/ENTER] joystick (Press the button.)	Decide the menu, etc.	

Touch panel of LCD unit	Remote control unit	Function
	[MEAS/ENTER] joystick (Joystick operation)	Selects the menu or moves the cursor. Switches the save destination folder of the image on the live screen. Switches the selected image on the thumbnail screen. ◀ displays the last image and ▶ displays the next image on the view screen.


Buttons and joystick of LCD unit	Remote control unit	Function
[ANGLE/LOCK] joystick (Press the button.)		Locks the angulation operation of the distal end of the insertion tube. Pressing this button while the angulation operation is locked will cancel the lock.
[ANGLE/LOCK] joystick (Joystick operation)		Operates the angulation of the distal end of the insertion tube. Pressing this button while the angulation operation is locked will adjust the angulation angle finely.
[ROTATE] button (When the image is displayed in 180 degrees rotation, the indicator upper side of the button turns ON.)	(No applicable button)	Rotates the image by 180 degrees.
[ANGLE SEL/CENTER] button ※ short-press (If the [ANGLE/LOCK] joystick of the LCD unit is operable, the indicator upper side of the button turns ON. If the [ANGLE/LOCK] joystick of the remote control unit is operable, the indicator upper side of the button turns OFF.)	(No applicable button)	Switches the enable/disable of the operation with the [ANGLE/LOCK] joystick of the remote control unit.
[ANGLE SEL/CENTER] button ※ long-press	[CENT] button	Centers the distal end of the insertion tube.
[RECORD] button ※ short-press		Records the still image.
[RECORD] button ※ long-press		Records the movie.
[FREEZE] button		Freezes the observation image. Pressing this button while the image is frozen will cancel the frozen state.

TIP

If multiple functions are assigned to the button, the time to press the button distinguishes each function. In this manual, the term “press” or “short-press” is used to indicate pressing a button for a short duration, while “long-press” means holding down a button approx. one second.

From this point forward, the descriptions in this instruction manual are on the premise that this instrument is operated with the LCD unit.

4-4 Observing the inspection object

- 1** Turn ON the illumination.
- 2** While looking at the display screen, insert the insertion tube into the inspection object. Insert the insertion tube carefully while checking the insertion direction.
- 3** Use the [ANGLE/LOCK] joystick to perform angulation operations and observe the applicable areas on the display screen.
Be careful not to apply the excessive pushing force, twisting or tension to the insertion tube.
- 4** Lock the angle and direction of the angulation section (angulation lock) and perform observation.
When the angulation section is set to the desired angle and direction, press the [ANGLE/LOCK] joystick.
The angulation angle can be adjusted finely even though the angulation is locked.
When the angulation is locked, the angle lock icon  appears in the upper right area of the LCD monitor.
Adjust and record the image if necessary.
- 5** While looking at the display screen, pull out the insertion tube from the inspection object slowly and carefully.
If the angulation is locked, press the [ANGLE/LOCK] joystick to unlock the angulation and then, pull out the insertion tube.

NOTE

- If the following message appears while inspecting, immediately stop observation, carefully pull out the insertion tube, and perform the required action as instructed in “1 Error messages” (page 66).
<HIGH TEMPERATURE (DISTAL END). PLEASE IMMEDIATELY PULL OUT THE INSERTION TUBE.>
- When operating the angulation section, do not bend the insertion tube to its minimum bend radius or less (20 mm for 4-mm type, 30 mm for 6-mm type and 6.2-mm type).

TIP

- 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 performance from the instrument.
- The angulation angle tends to be difficult to achieve under low temperatures.
- The image noise may be noticeable under high ambient temperatures.
- A yellow distal end temperature indicator appears when the ambient temperature of the distal end reaches approx. 80 °C.
Be careful that this indicates that the upper limit of the ambient operating temperature is approaching.
- The insertion tube bears index lines so that the length inserted in the inspection object can be known.

4-5 Withdrawing the scope unit

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

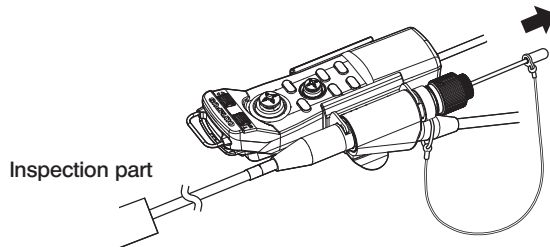
■ Troubleshooting when the hook is caught

Protrude the hook assembly from the channel of optical adapter and turn the hook assembly to unhitch the hook. If withdrawal is still impossible jettison the hook from the spring shaft according to the following procedure.

NOTE

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

- 1 Firmly tighten the chuck screw of the channel port to securely fix the hook assembly.
- 2 After keeping the insertion tube and the channel port straight, pull the channel port slowly and forcefully.
The hook will fall off the spring shaft.



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

TIP

When the hook breaks at the hook slits and falls off, a part of the broken hook remains attached to the spring shaft. Remove the remaining part by turning the spring shaft in the opposite to the direction the hook was screwed onto the spring shaft.

As mentioned in "3-11 Replacing the hook" (page 38), grip the distal end of the spring shaft with a pair of pliers. Taking care not to scratch the spring shaft's screw thread, lightly grip the remains of the hook with another pair of pliers and turn. The remaining part can be easily removed.

4-6 Adjusting the image display

1 Still image (Freeze)

1 While a live image is displayed, press the [FREEZE] button.

The observed image is frozen and the freeze icon (F) is displayed in the upper right corner of the LCD monitor. Do not insert or pull out the insertion tube while the image is frozen.

2 Tap the [LIVE] button or press the [FREEZE] button.

The image will be unfrozen.

TIP

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

2 Enlarging the image (Zoom)

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

ZOOM



Tapping the up button of the [ZOOM] button will zoom (enlarge) the image up to five times. To zoom back to the original image size, tap the down button of the [ZOOM] button.

TIP

- Images are zoomed using the “digital zoom” function. Therefore, the image may become slightly coarse at higher zoom factors.
- The zoom function is not available during the spot ranging. Tapping the [ZOOM] button during the spot ranging will change the measurement position of the object distance. For details, refer to “■ Measurement position of the object distance” (page 84).

3 Adjusting the brightness

■ Adjusting the light intensity by the [BRT] button

BRT



The [BRT] button is used to adjust the brightness when changing the overall brightness of the live image during observation.

Tapping the up button of the [BRT] button brightens the overall image and pressing the down button darkens it.

● Long exposure mode

While a live image is displayed, you can switch to the long exposure mode by setting the [BRT] (brightness level) to Level 10. This function is effective to display a higher level brightness than normal when viewing a very dark object, etc.

However, the image may be blurred under certain observation conditions.

Manual mode

In Manual mode, the brightness is fixed regardless of the conditions of the observation image. If you select this mode for observing the image which contains the motion and the significant contrast, as the brightness does not change, you can observe the image clearly.

1 Long-tap the [LIVE] button while a live image is displayed.

The Manual mode is selected and the Manual icon (M) is displayed in the upper right corner of the LCD monitor.

2 Long-tap the [LIVE] button.

The Manual mode is canceled.

4-7 Switching the folder on the live screen

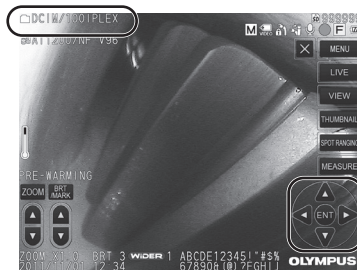
TIP

You can create a folder for recording and playing back the image. For details, refer to "1 File/folder operation menu" (page 75).

On the live screen, you can use the up/down/right/left button (▲▼◀▶) to switch the folder for recording and playing back the image.

1 While a live image is displayed, tap the up/down/left/right button (▲▼◀▶).

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



The folder displayed will be the folder for the image to be recorded or played back.

TIP

The folder configuration which can be switched with the up/down/left/right button (▲▼◀▶) is up to the second layer.

4-8 Recording images

The images being observed can be recorded in the image recording media (SDHC card) as still images or movies.

TIP

Only still images can be recorded in the USB flash drive.

Use the provided SDHC card or the recommended SDHC card.

Use the recommended USB flash drive.

Make sure that the image recording media is correctly loaded before use.

1 Image recording preparation

Format the image recording media with this instrument before using it. For details about formatting, refer to "MEDIA FORMAT" (page 67).

The following table shows the size of a single image and the approximate number of images that can be recorded on a SDHC card.

Recording format/ Recording time		Approximate single image size	Approximate image capacity/ Recording time (4 GB)
Still image	6-mm type	750 KB	5,400 images
	4-mm type 6.2-mm type	420 KB	9,600 images
	PAL	420 KB	9,600 images
	NTSC	300 KB	13,400 images
Movie (per sec.)		500 KB	100 minutes
Audio (per sec.)		16 KB	-

Settings for image recording must be configured using the menu operations. See "5-1 Menu operations" (page 64) and "5-2 Using the live screen/freeze screen" (page 66).

TIP

If <OFF> is set in the <STILL AUDIO> menu, the sound recording confirmation dialog is not displayed.

■ Recording the image display information

To record the date/time, title, logo, measurement results and other information displayed on the screen onto the still image, tap the [MENU] button on the live screen to display the menu, select <RECORD MODE> - <PRINT SCREEN ON/OFF> and set it to <ON> (See page 67).

TIP

Playing back the 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 save destination folders.
- Function to select file marks which are added to the end of file names.
- Function to select titles.

To enable the <FILE NAME MARK>, tap the [MENU] button on the live screen to display the menu, select <RECORD MODE> - <FILE NAME MARK> and set it to <ON> (See page 67).

■ Image file names

File names using the folder names of the save destination are assigned to images, and such images are recorded in the save destination folder in the SDHC card. You can change the file name to the name you desire (up to 30 alphanumeric characters and symbols).

Save destination folder name_?????.***

└ Extension

“JPG” for still image files, “WAV” for sound files and “AVI” for movie files.

5-digit file name serial number

The file name serial number is assigned sequentially from 00001 to 99999.

TIP

- If <ON> is set in the <FILE NAME MARK> menu, you can add the letter “_A”, “_B”, “_C” or “_D” at the end of image file names. Use this function to categorize image files.
- The category names of the file marks can be changed. (Contact Evident for details.)

2 Recording the still image

1 Select the folder of the save destination.

Tap the up/down/left/right button (▲▼◀▶) to select the folder of the save destination (see page 53).

2 While the live image is displayed, press the [FREEZE] button.

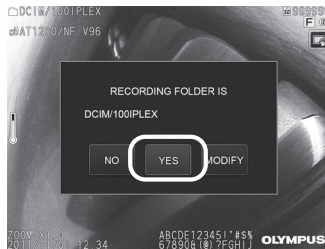
The image is frozen.

3 While the frozen image is displayed, short-press the [RECORD] button.

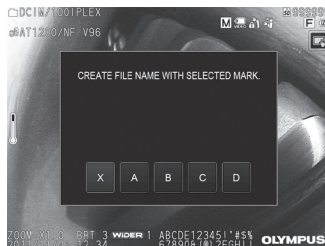
The folder name of the save destination appears.

4 Confirm the folder name and select <YES>.

If you want to change the folder, select <MODIFY> and change the folder of the save destination.



5 Select the mark to add to the end of the file name of the image you are recording.



- 6** Select the strings in the preset title list registered in advance.



TIP

For procedures to register the preset title in advance, see “3 Registering a text string as a preset title” (page 71).

- 7** The still image is recorded. The screen goes black for a moment and then the frozen image is displayed.

- 8** After the still image is recorded, the sound recording confirmation dialog appears.

- 9** Select **<YES>**.

The sound recording starts. The microphone icon blinks on the LCD monitor while the sound recording is in progress. If you select **<NO>** in the sound recording confirmation dialog, only the still image is recorded and the sound is not recorded.

- 10** Press the **[RECORD]** button to exit the sound recording.

TIP

- If **<OFF>** is set in the **<FILE NAME MARK>** menu, Step 4 to 6 is skipped.
- If **<OFF>** is set in the **<STILL AUDIO>** menu, Step 8 to 10 is skipped.
- Short-pressing the **[RECORD]** button while the live image is displayed will record the still image.
- Never attempt to insert or remove the image recording media while the data recording is in progress. Otherwise, the recording stops and an error message appears on the display.
- The sound recording stops automatically whenever the image recording media becomes full.
- The recorded still images can be measured in some cases. For details, refer to “6-5 Measurement” (page 85).
- The sound recording is available for one minute.

3 Recording the movie

1 Select the folder of the save destination.

Tap the up/down/left/right button (▲▼◀▶) to select the folder of the save destination (see page 53).

2 While the live image is displayed, long-press the [RECORD] button.

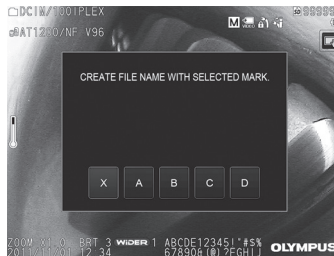
The folder name of the save destination appears.

3 Confirm the folder name and select <YES>.

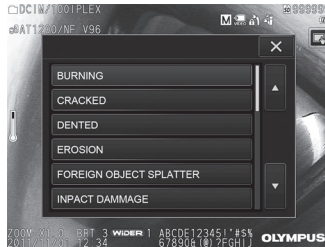
If you want to change the folder, select <MODIFY>, change the folder of the save destination and select <YES>.



4 Select the mark to add to the end of the file name of the image you are recording.



- 5** Select the strings in the preset title list registered in advance.



- 6** After the still image is recorded, the movie recording confirmation dialog appears.

- 7** Select **⟨YES⟩**.

The recording of the movie and the sound start. The red circle icon blinks on the LCD monitor while the movie recording is in progress. If you select **⟨NO⟩** in the movie recording confirmation dialog, only the still image is recorded and the movie is not recorded. If you select **⟨CONTINUE⟩** in the movie recording confirmation dialog, the movie is added to the movie that was recorded last and is recorded. For details, refer to “4 Appending the movie”.

- 8** Press the **[RECORD]** button to exit the movie recording.

The blinking of the red circle icon disappears when the movie recording is complete.

TIP

- If **⟨OFF⟩** is set in the **⟨FILE NAME MARK⟩** menu, Step 3 to 5 is skipped.
- Never attempt to insert or remove the SDHC card while the data recording is in progress. Otherwise, the recording stops and an error message appears on the display.
- The movie recording stops automatically whenever the SDHC card becomes full or when the file size reaches 4 GB. An empty 4 GB SDHC card has enough capacity to record approximately 90 minutes.

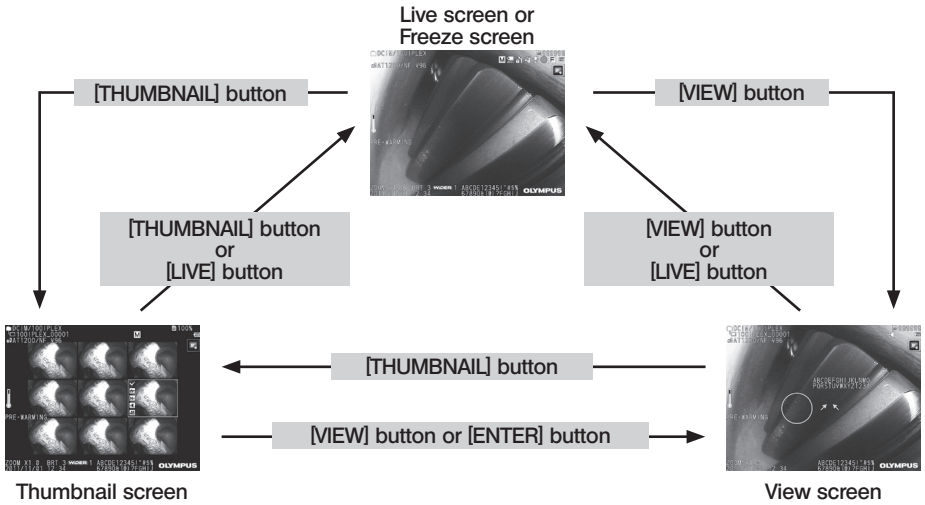
4 Appending the movie

You can append the movie to the movie that was recorded last.

Selecting **⟨CONTINUE⟩** in the movie recording confirmation dialog enables to add the movie to the movie that was recorded last. If the SDHC card is inserted or removed, or the **[VIEW]** button or the **[THUMBNAIL]** button is tapped, or the folder is changed between the image recording folder and the playback folder, **⟨CONTINUE⟩** cannot be selected.

4-9 Playing back the image

Recorded images can be displayed using either of two screen views: a full-screen view of a single image (view 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.



1 Playing back an image in a full-screen view (View screen)

1 Select the folder of the save destination.

See "4-7 Switching the folder on the live screen" (page 53) for details about operations.

2 Tap the [VIEW] button on the live screen or the freeze screen.

The recorded image is displayed in a full-screen view.

3 Switch the image you want to play back.

Tap the left/right move button (◀▶) to switch the image to be played back.

- Tap the move button (◀).

This scrolls from the currently displayed image to the image chronologically before it. While sorting images in descending order, after the last image is displayed, this operation will return to display the first image.


- Tap the move button (▶).

This scrolls from the currently displayed image to the image chronologically after it. While sorting images in ascending order, after the last image is displayed, this operation will return to display the first image.

4 Enlarge the image.

ZOOM



Tap the up button of the [ZOOM] button  to zoom (enlarge) the image up to five times. To zoom back to the original image size, tap the down button of the [ZOOM] button.

5 Tap the [VIEW] button or [LIVE] button to return to the live screen.

TIP

The still image recorded in the <BINOCULAR IMAGE> using NX can be measured after the image is recorded. For measurement, see "6 Stereo measurement function" (page 77).

2 Viewing the thumbnail screen and selecting the playback image

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

The thumbnail screen makes it useful when finding a particular image among a large group of images or when selecting multiple images to move and delete at a time.

1 Select the folder of the save destination.

See "4-7 Switching the folder on the live screen" (page 53) for details about operations.

2 Tap the [THUMBNAIL] button on the live screen, freeze screen or view screen.

A multi-image view of recorded images is displayed (up to nine images per screen).

The movie icon  appears for the movie.

The sound icon  appears for the image containing the sound.

The note icon  appears for the image containing the note information (text/symbol).

The measurement icon  appears for the measured image.

■ To select a thumbnail image

Tap the up/down/left/right button (▲▼◀▶) to move the frame.
The image framed is the image being selected.

■ To play back an image

Select the image to be played back and tap the [ENTER] button or tap the image to be played back.
The selected image is played back in a full-screen view.

■ To select or cancel selecting an image

Tap the check box in the upper left corner of the thumbnail image to display a check mark (✓) in the upper left corner of the thumbnail image.

Or select an image with the up/down/left/right button (▲▼◀▶) and then tap the up button of the [BRT] button (▲) to display a check mark (✓) in the upper left corner of the thumbnail image. Doing the same while a check mark (✓) is displayed in the upper left corner of the thumbnail image will cancel the mark (✓).

■ To select or cancel selecting all thumbnail images

Tapping the down button of the [BRT] button will display a check mark (✓) in the upper left corner of all thumbnail images.

To cancel marks (✓) on all thumbnail images, tap the down button of the [BRT] button again.

■ To move or delete the selected image

A check mark (✓) is displayed in the upper left corner of the thumbnail image. Repeat this step for all images you want to select, and use the menu operations to move or delete them.

3 Tap the [THUMBNAIL] button or the [LIVE] button to return to the live screen.

3 Sound attached to the still image

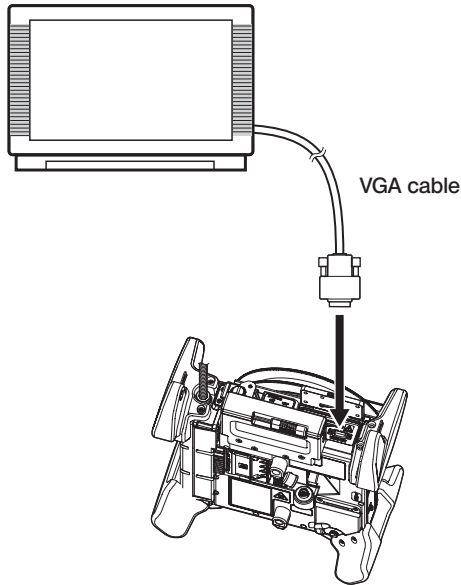
When the view screen is displayed, the sound is played back.

4 Playing back and pausing the movie

- Tapping the [ENTER] button while playing back the movie will pause the playback of the movie.
- Tapping the left (right) button (◀▶) while pausing will display the still image before (after) one second, and tapping the up (down) button (▲▼) will display the still image before (after) one minute.
- Tapping the [ENTER] button while pausing will resume playing back the movie.
- Pressing the [RECORD] button while pausing will record the image being paused as a still image.

4-10 Displaying live images on the external monitor

Connecting the VGA cable (commercially available) to the video terminal at the top of the main unit will display the live image on the external monitor (commercially available).



4-11 Using recorded images on a PC

The images recorded with this instrument can be used on a PC with InHelp VIEWER. The recorded images are loaded directly on a PC from the SDHC card or the USB flash drive containing those images.

To use InHelp VIEWER software, download it from the Evident website (<https://www.olympus-ims.com/en/service-and-support/downloads/>).

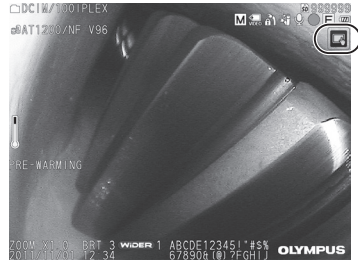
5 Menu operations and functions

5-1 Menu operations

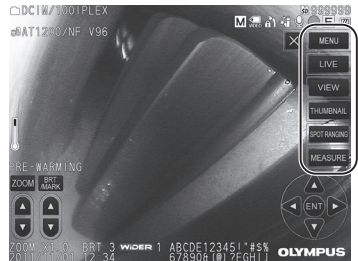
This instrument can be operated either with the remote control unit or the touch panel.

■ Using the touch panel

When operating this instrument with the touch panel, tap icons on the screen.

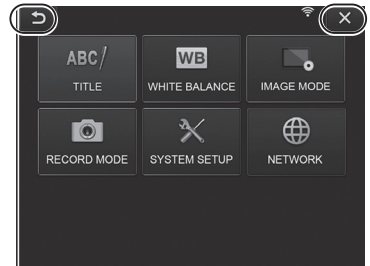


The operation icons are displayed.



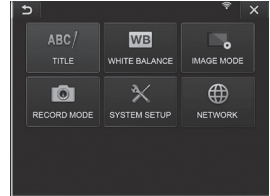
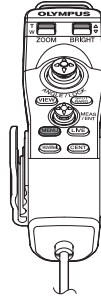
Tapping the back button (⏪) during menu operations will return to the screen one screen before.

Tapping the close button (✕) during menu operations will return to the screen before displaying the menu.



■ Using the remote control unit

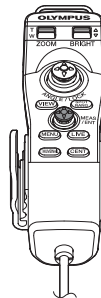
- 1 Press the [MENU] button.
The menu screen is displayed.



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







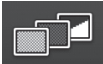


- 3 Press the [MEAS/ENTER] joystick to apply the settings and return to the previous screen.


























5-2 Using the live screen/freeze screen

1 Initial setting menu

When you turn ON the power of this instrument, the live screen appears. Tapping the [MENU] button on the live screen and/or the freeze screen allows you to set the following settings.

Main menu	Sub menu	Item
<TITLE> 	–	Inputs a title. Puts a title on the live screen and recorded images. Up to 30 characters can be inputted. See "2 Inputting a title" (page 69).
<WHITE BALANCE> 	–	Adjusts the white balance (Live screen only). Specifies whether to adjust the white balance or not. <ul style="list-style-type: none"> • <CANCEL> : Do not adjust. • <EXECUTE> : Adjust. When replacing parts like the optical adapter, adjust the white balance by capturing an image of a white object such as a piece of paper, from a distance of 50 to 60 mm.
<IMAGE MODE> 	<SHARPNESS> 	Adjusts the sharpness of the image The sharpness level increases from left to right (4 levels). See "4 Adjusting the image sharpness" (page 72).
	<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 "5 Adjusting the image saturation" (page 72).
	<WIDER> 	Enables the WIDER function. The level can be selected from <OFF>, <WIDER1> and <WIDER2>. The level increases in the order of <OFF>, <WIDER1> and <WIDER2>.
	<NOISE REDUCTION> 	Reduces the noise from the image. The effect level increases in the order of <OFF>, <LOW>, <MEDIUM> and <HIGH>. <div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block; margin-top: 10px;">TIP</div> <p style="margin-left: 20px;">If you set <NOISE REDUCTION> to <HIGH>, it may take several seconds to complete freezing.</p>

Main menu	Sub menu	Item
<IMAGE MODE> 	<STEREO ADAPTER IMAGE DISPLAY MODE> 	Selects the screen in <MONOCULAR IMAGE> or <BINOCULAR IMAGE>. Sets the live image whether to display in monocular view or binocular view when the stereo optical adapter is attached. <ul style="list-style-type: none"> • <MONOCULAR IMAGE>: Displays the image in monocular view (one screen) • <BINOCULAR IMAGE>: Displays the image in binocular view (two screens)
	<GRID> 	Displays the grid on the screen. The grid display can be selected from <OFF> or three grid types. The grid is displayed on the live screen.
	<STEREO ADAPTER SELECT> 	Displays the stereo optical adapter list. Selecting to decide the optical adapter will set the stereo optical adapter that is connected to the system.
<RECORD MODE> 	<PRINT SCREEN> 	Records the texts and the graphic data over the still images or movies. Switches whether to record the texts and the graphic data over the still images or movies.
	<FILE NAME MARK> 	Specifies whether to add the markings to the file names of the still image or the movie. <ul style="list-style-type: none"> • <OFF>: The mark is not attached. • <ON> : The mark is attached. You can select the marking to be added when recording the image. The markings can be selected from "None, _A, _B, _C and _D".
	<STILL AUDIO> 	Switches whether to record the sound when recording the image. The sound recording can be selected from <ON> or <OFF>. If <ON> is selected, the sound recording confirmation dialog appears when recording the still image.
	<MEDIA> 	Selects the drive for recording and playing back. The SDHC card or the USB flash drive can be selected.
	<MEDIA FORMAT> 	Formats the media (SDHC card or USB flash drive) currently selected.

Main menu	Sub menu	Item
<SYSTEM SETUP> 	<DISPLAY> 	Selects whether to show or hide the information on the screen.
	<AUDIO VOLUME> 	Specifies the sound volume. Adjust the output sound volume according to the specified sound volume. The sound volume can be selected from <OFF>, <LOW>, <MEDIUM> and <HIGH> (4 levels).
	<BEEP> 	Sets the output of the operation sound (beep sound). The beep sound can be selected from <ON> or <OFF>.
	<VIDEO IN> 	Specifies the image input mode for next startup. The input mode can be selected from <OFF>, <NTSC> or <PAL>.
	<DATE TIME> 	Specifies date and time.
	<LANGUAGE> 	Specifies the display language. Selects the language used for menus and messages. English and other languages are supported. The default setting is [ENGLISH].
	<VERSION> 	Displays the software version.
	<FINE MODE SPEED> 	Specifies the angulation speed for the angulation lock. The angulation speed can be selected from <SLOW>, <STANDARD> and <FAST> (3 levels).
<NETWORK> 	<WIRELESS> 	Specifies the wireless communication. Enables the wireless communication. Specifies and selects the access point.
	<TRANSFER AS RECORDING> 	Specifies the transfer as recording. OFF: Disables the transfer as recording. ON: Enables the transfer as recording. Enabling this setting allows you to upload the still image to the cloud server in conjunction with the recording operation.
	<DEVICE AUTHENTICATION> 	Specifies the device authentication. Input the PIN code to process the device authentication.

2 Inputting a title

There are two methods shown below that can be used to input a title.

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

■ Inputting text from the on-screen keyboard



1 Select the input mode.

2 Select the text buttons you want.

The texts you selected appear in the title input box. Edit the text, if necessary.

● To delete texts

- To delete a single text, move the cursor to it and select <DELETE>.
- To delete all input texts, select <CLEAR>.

● To input a space

Move the cursor to the location where you want to input the space, select <SPACE>.

3 Select <EXECUTE>.

The title you input is displayed on the live/freeze screen.

■ Selecting a preset title for input

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



1 Select <PRESET>.

A list of preset titles is displayed. To cancel the preset title selection, tap the close button (X) to close the screen.

2 Select the strings from the preset title list.

The text string you selected appears in the title input box and the list is closed. Repeat steps 1 and 2 to complete inputting of the title.

TIP

The preset title list has nine pages. To change pages, select the text string in line 1 or line 6 of the currently displayed page, and then tap the up button or the down button.

3 Select <EXECUTE>.

The title you selected is displayed on the live/freeze screen.

3 Registering a text string as a preset title

After you register the frequently used text strings as preset titles, you can recall them when you are inputting titles. You can register a maximum of 54 text strings to preset titles.



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

For details about inputting, see "2 Inputting a title" (page 69).

2 Select <ENTRY>.

A list of preset titles is displayed.

To cancel the preset title registration, tap the close button (X) to close the screen.

TIP

The preset title list has nine pages. To change pages, select the text string in line 1 or line 6 of the currently displayed page, and then tap the up button or the down button.

3 Select the line for registering the text string.

The text string you input in the title input box is registered as 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.

The preset title list screen is closed.

4 Adjusting the image sharpness

The frame sharpness of the image can be emphasized.

⟨IMAGE MODE⟩ - ⟨SHARPNESS⟩



Tapping the button will change the frame sharpness level.
If you get the suitable sharpness, tap the close button (X).

5 Adjusting the image saturation

The saturation of the image can be adjusted.

⟨IMAGE MODE⟩ - ⟨SATURATION⟩

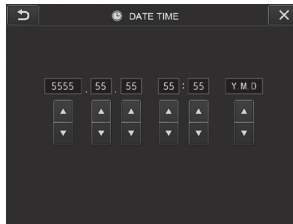


Tapping the button will change the saturation level.
If you get the suitable saturation, tap the close button (X).

6 Setting date and time

Use the procedure below to specify date and time.

〈SYSTEM SETUP〉 - 〈DATE TIME〉



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

7 LANGUAGE

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

〈SYSTEM SETUP〉 - 〈LANGUAGE〉



TIP

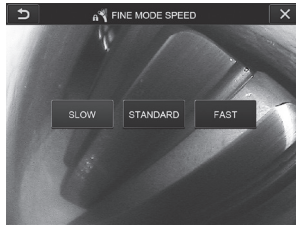
The initial language is set to English. Change to your desired language if necessary.

8

FINE MODE SPEED

Specifies the angulation speed for the angulation lock.

〈SYSTEM SETUP〉 - 〈FINE MODE SPEED〉










Select either 〈SLOW〉, 〈STANDARD〉 or 〈FAST〉.

5-3 Using the thumbnail/view screens

1 File/folder operation menu

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

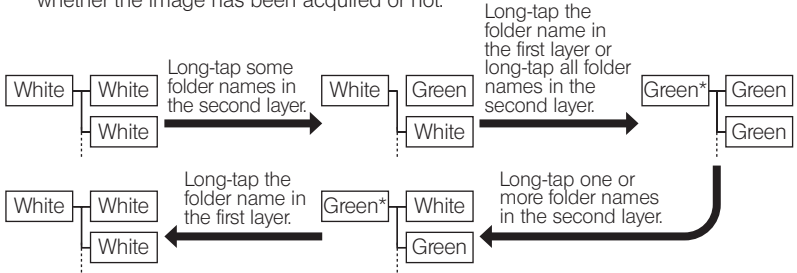
Menu	Available settings
<DELETE> 	Deletes the recorded image. <ul style="list-style-type: none"> • <CANCEL> : Do not delete image. • <EXECUTE> : Delete image. On the thumbnail screen, the currently selected image or all images that are check-marked (✓) are deleted.
<MOVE FILE> 	Moves image files to folders (Thumbnail screen only). Recorded images can be moved to a different folder. The currently selected image or all images that are check-marked (✓) on the thumbnail screen are moved.
<RENAME FILE> 	Renames the image file (Thumbnail screen only). You can change the name of a recorded image file (within 30 letters).
<CHANGE FOLDER> 	Switches a folder for image recording and playback (Thumbnail screen only). You can switch a folder for image recording and playback by tapping the folder. The default setting is [DCIM\100IPLEX]. You can switch the color of the folder name between white and green by long-tapping the folder. The default setting is [White]. For procedures to change the color, see page 76.
<MAKE FOLDER> 	Creates a new folder for image recording and playback. You can create a folder for image recording and playback.
<RENAME FOLDER> 	Renames a folder for image recording and playback. You can rename a folder for image recording and playback.
<BATCH TRANSFER> 	Upload the still image files by batch. You can upload the still image files saved in the folder to the cloud server by batch.

TIP

You can use only alphanumeric characters and symbols for folder and file names. Some symbols cannot be used for folder and file names.





TIP

The color of the folder name in the first layer is switched in conjunction with that in the second layer as follows. For example, the color of the folder name can express whether the image has been acquired or not.



* The color of the folder name in the first layer can be switched from green to white only by long-tapping the folder name in the first layer. (It is not switched in conjunction with switching the color of the folder name in the second layer.)


The menu displayed on the view screen (only view screen for still image) can be used for the following settings.

Menu	Available settings
<DELETE> 	Deletes the recorded image. <ul style="list-style-type: none"> • <CANCEL> : Do not delete image. • <EXECUTE> : Delete image. On the view screen, the currently displayed image is deleted.
<NOTE> 	Inputs the note information (texts/symbols) to the desired position on the screen. You can input the note information (texts/symbols) by tapping on the still image that is being played back or by tapping the up/down/left/right button (▲ ▼ ◀ ▶).
<COMPARE> 	Displays the comparison screen. <ul style="list-style-type: none"> • <CANCEL> : Back to the view screen. • <EXECUTE> : Displays the comparison screen. To hide the comparison screen, tap the [MENU] button.
<GHOST> 	Displays the ghost screen. <ul style="list-style-type: none"> • <CANCEL> : Back to the view screen. • <EXECUTE> : Displays the ghost screen. To hide the ghost screen, tap the [MENU] button.

6 Stereo measurement function

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, Evident cannot guarantee the accuracy of measurement results. We recommend that users identify the measurement accuracy through experiments.

This measurement method uses the left and right images acquired by two objective lenses that are set in parallax and identifies the corresponding points in the right image located at the same positions as the measurement points and the reference points specified in the left image. If a position of a corresponding point is displaced from a measurement point or a reference point, the correct measurement result cannot be obtained. In this case, correct the position of the point (refer to “ Modifying the point” (page 91)), alternatively, change the point of view by moving the tip of the scope to perform measurement.

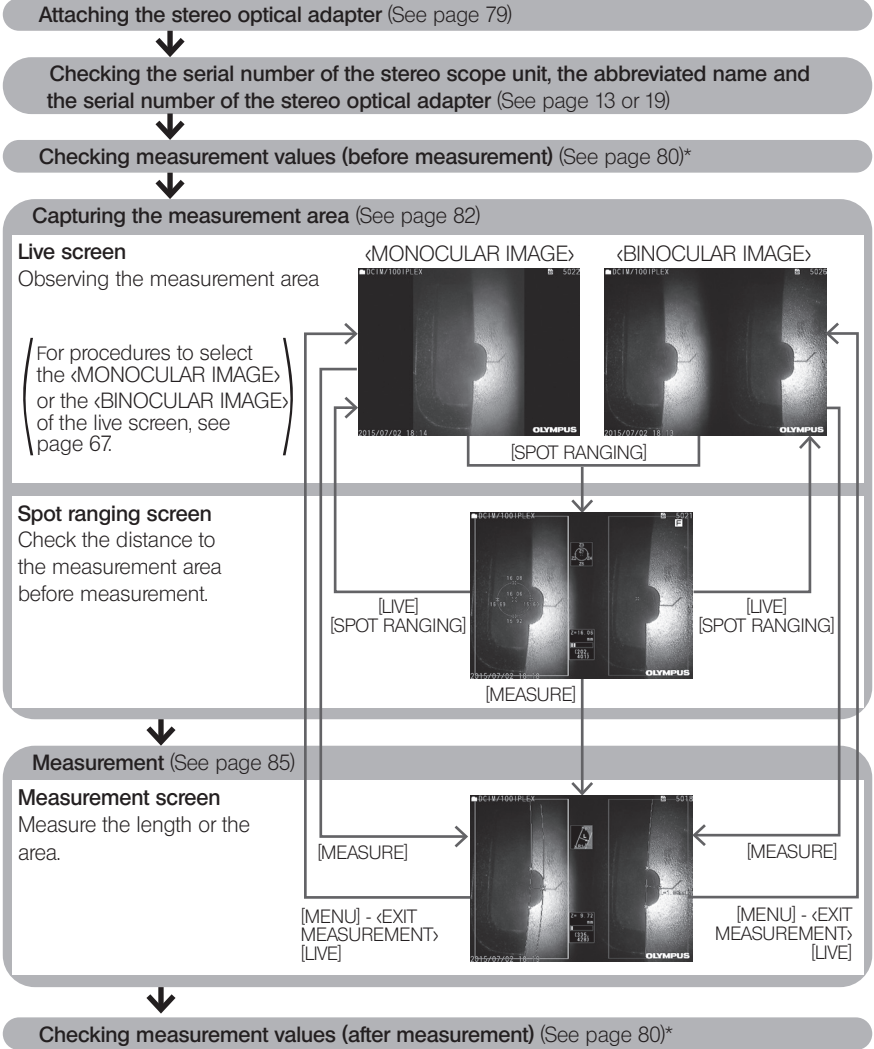
This stereo measurement function allows you to select the display mode of the live image from either the \langle MONOCULAR IMAGE \rangle or the \langle BINOCULAR IMAGE \rangle .

The \langle MONOCULAR IMAGE \rangle is a display mode to observe the approach to the measurement area easily on the screen.

The stereo scope unit (optional) is required for the stereo measurement.

6-1 Measurement Flow

The following shows measurement procedures and the screen flow.

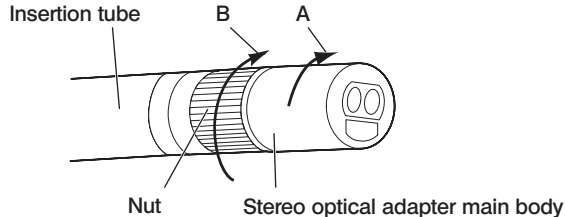


* Make sure that the measurement values obtained when “Checking measurement values (before measurement)” and when “Checking measurement values (after measurement)” are almost identical. If the measurement values differ from each other, check that the stereo optical adapter is not loose and the lens is not dirty, and measure again if necessary.

6-2 Attaching the stereo optical adapter

See also “3-16 Pre-operation/post-operation inspections” (page 44) for more information on attaching stereo optical adapters.

- 1** Make sure that the O-ring in the distal end is properly attached.
See “3-5 Attaching and removing the optical adapter” (page 31) for information on how to check the O-ring.
- 2** Attach the adapter so that there is no movement of the stereo optical adapter main body. Rotate the stereo optical adapter in the direction of the arrow A shown in the figure. Keep the stereo optical adapter rotated completely and turn the nut of the stereo optical adapter in the direction of the arrow B shown in the figure until it is tight.

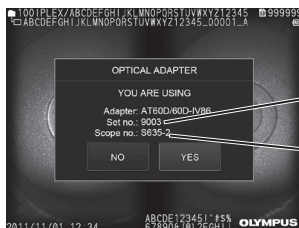


NOTE

- When securing the stereo optical adapter to the distal end, do not use tools or tighten with excessive force.
- Make sure that the stereo optical adapter is attached properly, is not loose, and is free from dirt and dust particles.
- If the attached stereo 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 the stereo optical adapter is attached, if the distal end is handled by grasping the stereo optical adapter, it may turn in the opposite direction of arrow A in the picture even though the nut is tightened securely. This could result in deteriorating the measurement accuracy. When handling the distal end, do not hold it by the stereo optical adapter, but always grasp the insertion tube. However, do not hold it by the angulation section.
- When the distal end of the insertion tube is subjected to a large extraneous force or vibration, the stereo optical adapter installation may be jolted, loosened or turned. Even if you leave the stereo optical adapter attached to the insertion tube, always check the installation condition before inserting the insertion tube into the observation measurement area.

TIP

When the stereo optical adapter is attached to the instrument, the stereo optical adapter is recognized automatically and the optical adapter confirmation dialog appears.



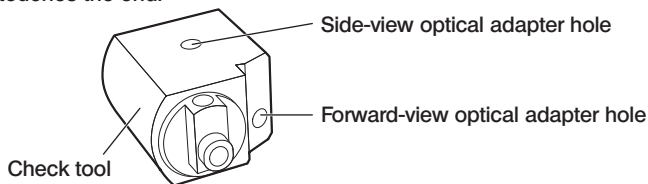
Serial No. of stereo optical adapter
Serial No. of stereo scope unit

Check that Serial No. of the stereo optical adapter attached is consistent with Serial No. of the scope unit, and tap <YES>. If the stereo optical adapter is not recognized automatically, you can use the <STEREO ADAPTER SELECT> menu to recognize the stereo optical adapter manually. (See page 67)

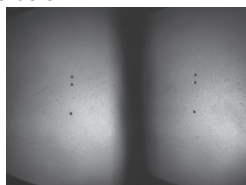
6-3 Checking measurement values

The measurement accuracy may be degraded by loose attachment of the stereo optical adapter or dirt on the lens components. Use the check tool to check the measurement values before and after measurement.

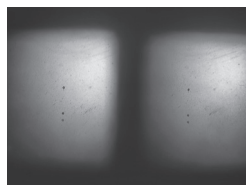
- 1 Insert the distal end of the insertion tube into the stereo optical adapter hole of the check tool until it touches the end.



- 2 Rotate the check tool so that you can get an image similar to the one shown in the picture below.



Forward-view optical adapter



Side-view optical adapter

- 3** While the live image is displayed, tap the [SPOT RANGING] button.

The spot ranging screen is displayed.

- 4** While the distal end of the insertion tube is being inserted into the stereo optical adapter hole of the check tool until it touches the end, confirm that the distance is 15 mm or less in the object distance display box and tap the [MEASURE] button.

The measurement method selection screen is displayed.

- 5** Tap <Distance>.

The measurement screen is displayed.

- 6** Tap on the left image area or tap the up/down/left/right button (▲▼◀▶) to move the cursor. And tap the [ENTER] button to specify the measurement points. (2 points)

- 7** Press the [RECORD] button.

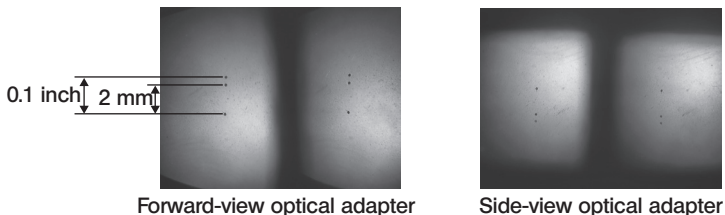
The measured image is recorded.

- 8** Confirm that the measurement values before and after measurement are both within following error range from the standard value (2 mm or 0.1 inch).

- 6-mm type: $\pm 1\%$ or less
- 4-mm type, 6.2-mm type: $\pm 2\%$ or less

If the error range exceeds the above value, reattach the stereo optical adapter (refer to "6-2 Attaching the stereo optical adapter" (page 79)), then inspect that the stereo optical adapter is not loose and the lens is not dirty, and check measurement values again. If the error range still exceeds the above value when checking measurement values for a few times, contact Evident.

Also, if the measurement values differ significantly between before and after measurement, inspect the adapter in the same way, and check measurement values again if necessary.



TIP

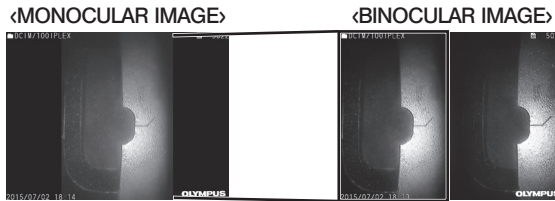
- If the stereo optical adapter is loose, make sure that the O-ring is not detached (see "3-5 Attaching and removing the optical adapter" (page 31)).
- The periodic calibration of check tools is recommended to secure the validity of measurement results. The customer is responsible for deciding the calibration cycle (interval) depending on your usage status and required accuracy. For details, see "10-5 Recalibration of check tools" (page 113) in the this manual.

6-4 Observing the measurement area

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

1 Observing the measurement area on the live screen

Observe the measurement area by setting your favorite display mode to either the <MONOCULAR IMAGE> or the <BINOCULAR IMAGE>.



See also “4-4 Observing the inspection object” (page 50) for more information on observing the measurement area.

TIP

- 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 shadows 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] button to adjust the image to slightly darker.

- To change the display mode, see page “5-2 Using the live screen/freeze screen” (page 66).
- Restriction of <MONOCULAR IMAGE>
The left image of the <BINOCULAR IMAGE> is displayed only.
- Restriction of <BINOCULAR IMAGE>
The zoom function 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 stereo 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

2 Measuring the distance to the measurement area by spot ranging

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

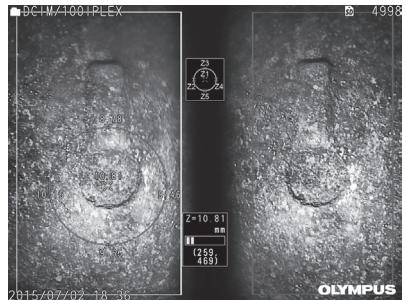
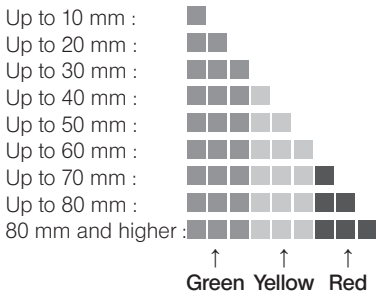
While the live screen or the freeze screen is displayed, tap the [SPOT RANGING] button. The spot ranging screen is displayed.

TIP

- The spot ranging is not available while recording the movie.
- The live image on the spot ranging screen is displayed only in the «BINOCULAR IMAGE».
- If the [FREEZE] button is pressed on the spot ranging screen in live view, the spot ranging screen is frozen.
- Restriction during spot ranging
 The zoom function is not available. If you tap the [ZOOM] button during the spot ranging, the measurement position of the object distance is changed. For details, refer to “■ Measurement position of the object distance” (page 84).

■ Spot ranging screen


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







■ Measurement position of the object distance

Display the circle centering the cursor position in the left image area. You can also confirm the object distance by the up/down/left/right points of the cursor position (on the circle).



If you tap the up button of the [ZOOM] button , the circle can be enlarged up to 3 levels and the measurement position can be changed. To return to the original measurement position, tap the down button of the [ZOOM] button.

■ Moving the cursor

Tap the position you want to move the cursor in the left image area. Tapping the up/down/left/right button (   ) moves the cursor position gradually. Long-tapping the move button moves the cursor position continuously.

■ Starting the measurement

Tap the [MEASURE] button. The measurement screen is displayed.

TIP

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

■ Finishing the spot ranging

Tap the [MENU] button, [LIVE] button or the [SPOT RANGING] button to display the live screen or the freeze screen.

Tap the [VIEW] button to display the view screen.

Tap the [THUMBNAIL] button to display the thumbnail screen.

6-5 Measurement

1 Measurement

- 1 While displaying the spot ranging screen, the live/freeze screen or the view screen (image recorded in the <BINOCULAR IMAGE>), tap the [MEASURE] button.**

The measurement method selection screen is displayed.

TIP

- Acquire multiple images with different view points, and measure them.
- Make sure that the measurement area is not blurred on the acquired image.
- If the image is being zoomed on the view screen, the measurement is not available.
- Still images acquired by PRINT SCREEN cannot be measured.
- Still images acquired by the external inputting device cannot be measured.
- The still images recorded in the <MONOCULAR IMAGE> cannot be measured.

- 2 Select a measurement method.**

Select the measurement method to display the measurement screen.

- 3 Specify the measurement points or reference points, and confirm the corresponding points.**

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).

- 4 Record the measurement results.**

Press the [RECORD] button to record the image with the measurement results.

- 5 Exit from measurement.**

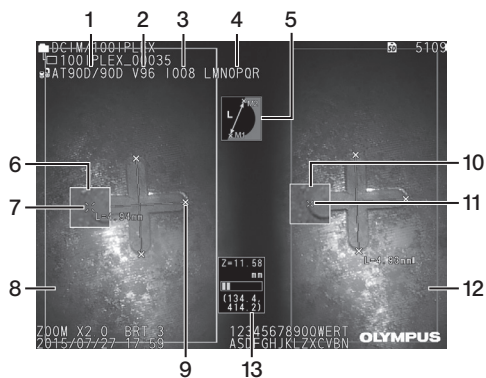
Tap the [LIVE] button to display the measurement exit confirmation dialog. And select <YES> to exit from stereo measurement. Select <NO> to return to the measurement screen. Or select <EXIT MEASUREMENT> in the measurement menu screen and select <EXECUTE> to exit the stereo measurement and return to the screen before the stereo measurement is activated. Select <CANCEL> to return to the measurement screen.

■ Checking measurement values

The measurement values must be checked before and after measurement.

See "6-3 Checking measurement values" (page 80) for details about operations.

■ Explanation of the measurement screen











No.	Item
1	Product abbreviation
2	Scope diameter
3	Serial No. of stereo optical adapter
4	Serial No. of stereo scope unit
5	Measurement method icon
6	Cursor zoom window Displays zoomed image around a specified point.
7	Cursor Specifies a measurement point or reference point.
8	Left image area
9	Point Indicates a specified measurement point or reference point.
10	Corresponding point zoom window Displays zoomed image around corresponding point.
11	Corresponding point
12	Right image area The three most recent measurement results are displayed. The object distance mark (■) (see "■ Spot ranging screen" (page 83)) indicating the object distance to the measurement point is displayed on the right side of the measurement value.
13	Object distance display box The distance from the distal end of the insertion tube to the cursor position is displayed. The object distance mark (■) (see "■ Spot ranging screen" (page 83)) is displayed.

■ Menu display and functions

When the [MENU] button is tapped on the measurement screen.



Menu	Available settings
<CLEAR> 	Clears the measurement point or reference point specified last.
<ALL CLEAR> 	Clears all specified measurement points and reference points.
<MODIFY> 	Modifying the measurement points or reference points (left image area), or corresponding point (right image area).
<METHOD> 	Selects a measurement method. See "3 Measurement method types" (page 88) for details about operations.
<3D OPTION> 	Selects 2D view or 3D view. See "5 <3D OPTION>" (page 92) for details of operations..
<UNIT> 	Selects the unit of the measurement results. Selects <mm> or <inch>.
<CURSOR> 	Selects a cursor shape. Selects [x], [←] or [+]. On the spot ranging screen, the cursor is displayed as [x].
<EXIT MEASUREMENT> 	Exits the stereo measurement screen. The display returns to the screen before stereo measurement starts.

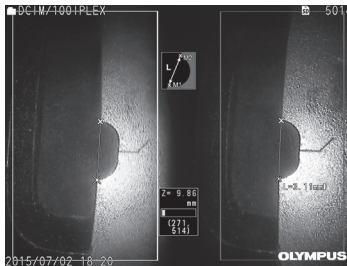
3

Measurement method types

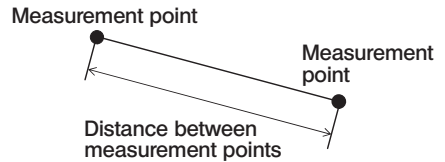
The measurement method selection screen is displayed immediately after starting the stereo measurement or when **⟨METHOD⟩** is selected in the measurement menu screen. The following four measurement methods are available.

■ **⟨Distance⟩**

This mode allows for measuring the distance between two specified measurement points. Place the cursor on both ends of the measurement area you want to measure and tap the **[ENTER]** button to specify the measurement points.

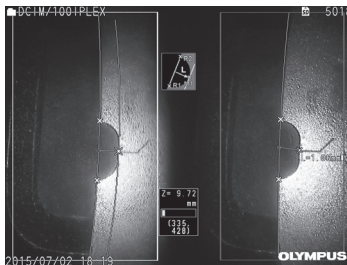


⟨Distance⟩

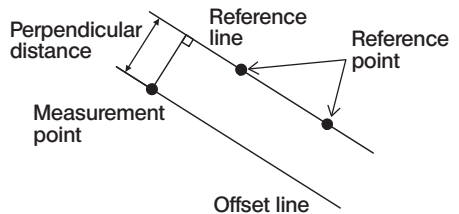


■ **⟨Point to Line⟩**

This mode allows for measuring the distance from a measurement point to the reference line specified by two reference points and also displaying the offset line parallel to the reference line passing through the measurement point.



⟨Point to Line⟩

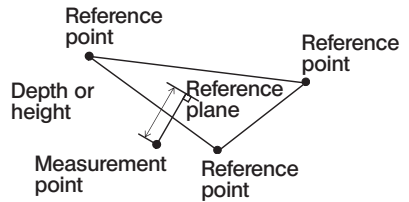


■ <Depth>

This mode allows for measuring the distance from a measurement point to the reference plane specified 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>

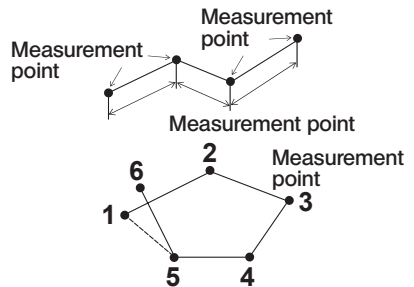


■ <Area/Lines>

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>



■ Specifying and moving the measurement points


Tap the position you want to move the cursor in the left image area. Tapping the up/down/left/right button (▲ ▼ ◀ ▶) moves the cursor position gradually.


Long-tapping the move button moves the cursor position continuously.

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

Note that the object distance showing <- - - mm>, indicates that the correct reference point was not automatically acquired.

■ Displaying the zoom

If you tap the up button of the [ZOOM] button  during the stereo measurement, the image around the current cursor position and the image around the corresponding point will be displayed on the cursor zoom window and the corresponding point zoom window respectively. If you tap on the left image area while displaying the cursor zoom window or tap the up/down/left/right button (▲ ▼ ◀ ▶), the zoom image will be moved and you can specify the cursor position.

To change the zoom magnification, tap the [ZOOM] button . You can set the zoom magnification to 2X, 3X or 4X. Tapping the up button will increase the zoom magnification and tapping the down button to decrease the zoom magnification.

If you tap the down button when the zoom magnification is set to 2X, the cursor zoom window and the corresponding point zoom window will disappear.

■ Re-specifying the measurement points or reference points

If the incorrect measurement points or reference points were specified by mistake, select <CLEAR>, in the measurement menu.

■ Re-measurement

If you want to restart measuring on the image from the beginning, select <ALL CLEAR> in the measurement menu and clear all measurement points and reference points.

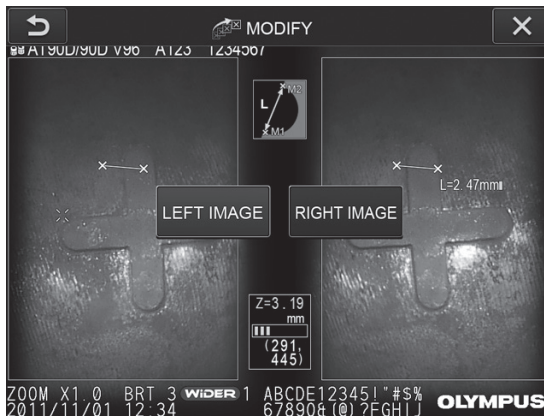
■ Modifying the point

To correct the position of the measurement points or reference points (left image area), or corresponding points (right image area), select <MODIFY> in the measurement menu.

Tap the <LEFT IMAGE> to correct the measurement points or reference points, or tap the <RIGHT IMAGE> to correct the corresponding points.

Next, select a point to be corrected by tapping the up/down/left/right button (▲▼◀▶) and tap the [ENTER] button to fix it.

Then move the point by tapping the up/down/left/right button (▲▼◀▶) and tap the [ENTER] button to fix the position. If you tap the [MENU] button before tapping the [ENTER] button, the correction is canceled.



<MODIFY> menu

5

〈3D OPTION〉

The object for measurement can be displayed in 3D.





Select [3D option] on the measurement menu screen, and select the view mode from 〈2D/2D〉, 〈2D/3D〉, 〈3D〉, 〈2D/3D (color map)〉 or 〈3D (color map)〉.

TIP



If the view mode is 〈3D〉 or 〈3D (color map)〉, you cannot specify the measurement points or reference points. The object distance mark (■) (see “■ Spot ranging screen” (page 83)) indicating the object distance to the measurement point is displayed on the right side of the measurement value.

■ Operating on 3D view area

Some functions are switched between the LCD unit and the remote control unit. For details, see the table below.

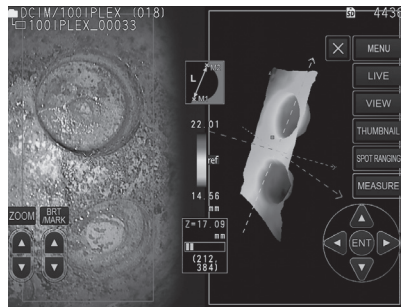
Touch panel of LCD unit		Remote control unit	Function
	※ long-tap	[MENU] button ※ long-press	Shows/hides the coordinate axis (X-axis (Red), Y-axis (Green), Z-axis (Blue)).
	※ long-tap	[LIVE] button ※ long-press	The 3D image view returns to the original status.
	※ tap	[SPOT RANGING] button ※ short-press	Changes the 3D image view direction in the order of X-axis, Y-axis and Z-axis.
	※ long-tap	[SPOT RANGING] button ※ long-press	The function of the [ZOOM] button changes from the operation to zoom in/out the image to the operation of the cross section view.*
		[ZOOM] lever	Zooms in/out. ▲ enlarges the image and ▼ reduces the image. In the operation of cross section view, ▲ moves the cross section from front to back and ▼ moves it from back to front.

* In the operation of cross section view, the cross section view icon (S) appears in the upper right area the LCD monitor.

Touch panel of LCD unit		Remote control unit	Function
	※ tap	[MEAS/ENTER] joystick ※ short-press	Switches between rotation and parallel movement.
	※ long-tap	[MEAS/ENTER] joystick ※ long-press	Changes the object for operation in binocular view to 2D view (left image area) or 3D view (right image area).
		[MEAS/ENTER] joystick (Joystick operation)	Rotates the 3D view or moves it in parallel.

■ Color map view

The distance to the object for measurement is displayed in color with the distal end of the stereo optical adapter as a reference. If the reference plane is specified in depth mode, the depth (height) with the specified reference plane as a reference is displayed in color.



The following marks are displayed at the nearest (shallowest) position and the furthest (deepest) position on 3D view.

Mark	Distal end as reference	Specified reference plane as reference
▲	Nearest position	Shallowest position
▼	Farthest position	Deepest position

TIP

The values on the color chart and ▲▼ positions on the color map are for reference only. For acquiring accurate values, see “6-5 Measurement” (page 85).

7 Scaler measurement function

Scaler measurement measures the length of an object using the reference length value that is preset according to a known length inside the observation image.

NOTE

In other words, an accurate measurement cannot be obtained if the reference length is incorrect. Also, the measurement is made based on the assumption that the reference object and the object for measurement are on the same vertical plane as the optical axis.

7-1 Measurement flow

The following shows measurement procedures and the screen flow.

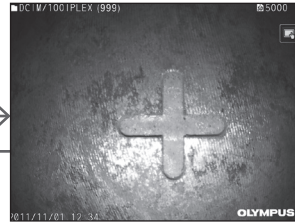
Attaching the optical adapter (See page 95)



Capturing the measurement area (See page 95)

Live screen

Observing the measurement area.



Measurement (See page 96)

Measurement screen

Measure the length.

[MEASURE]

[MENU] - <EXIT MEASUREMENT>
[LIVE]



7-2 Attaching the optical adapter

Attach optical adapters, other than stereo optical adapters, to the scope distal end by following the procedure described in “3-5 Attaching and removing the optical adapter” (page 31).

TIP

When the optical adapter is attached to the instrument, the optical adapter is recognized automatically and the following message is displayed.



Make sure that the name of the optical adapter is correct.

7-3 Observing the measurement area

Observing the measurement area in the live screen and check that the image is appropriate for measurement.



See also “4-4 Observing the inspection object” (page 50) for more information on observing the measurement area.

7-4 Measurement

1 While displaying the live/freeze screen, tap the [MEASURE] button.

The measurement screen is displayed.

2 Specify the reference points.

Place the cursor on each extremity of an object with a known length in the observed image and tap the [ENTER] button.

3 Set the reference length.

When the reference length input message is displayed, enter the known length by tapping the up/down/left/right button (▲ ▼ ◀ ▶) and tap the [ENTER] button to fix it.

4 Specify the measurement points.

Place the cursor on each extremity of the measurement object and tap the [ENTER] button to measure its length.

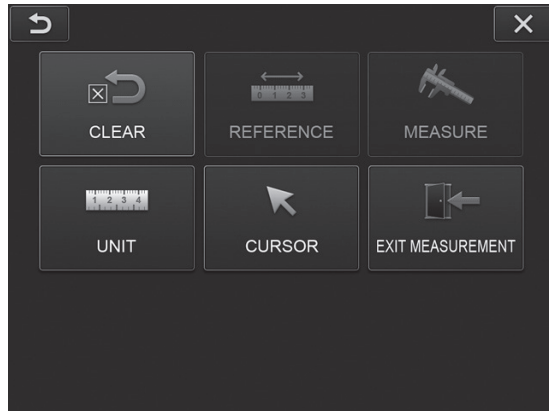
5 Record the measurement results.







Press the [RECORD] button to record the image with the measurement results.

6 Exit from measurement.

Tap the [LIVE] button to display the measurement exit confirmation dialog. And select <YES> to exit from scaler measurement. Select <NO> to return to the measurement screen. Or select <EXIT MEASUREMENT> in the measurement menu screen and select <EXECUTE> to exit the scaler measurement and return to the screen before the scaler measurement is activated. Select <CANCEL> to return to the measurement screen.

■ Menu display and functions of the scaler measurement screen



Menu	Available settings
<CLEAR> 	Clears the measurement point or reference point specified last.
<REFERENCE> 	Sets new reference length.
<MEASURE> 	Sets new measurement points.
<UNIT> 	Selects the unit of the measurement results. Selects <mm> or <inch>.
<CURSOR> 	Selects a cursor shape. Selects [x], [←] or [+].
<EXIT MEASUREMENT> 	Exits the scaler measurement screen. The display returns to the screen before scaler measurement starts.

8 Network function

8-1 Connecting to the wireless LAN

NOTE

- Please note that the network function of this product is valid only in some areas.
- Before starting the instrument, be sure to connect the USB wireless LAN adapter to the instrument.

1 Attaching the USB wireless LAN adapter

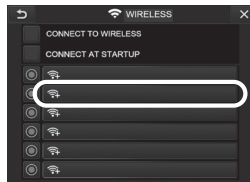
See "Attaching and removing the USB wireless LAN adapter" (page 43).

2 Setting the wireless LAN

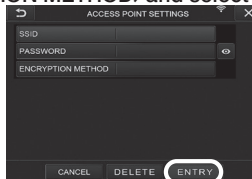
■ When operating with the remote control unit


1 Select [MENU] - <NETWORK> - <WIRELESS>.

2 When the wireless setting window shown below appears, tilt the [MEAS/ENTER] joystick of the remote control unit to the right to select the blank access point row, and short-press the [ENTER] button.



3 When the access point setting window appears, input <SSID> and <PASSWORD>. Then, select <ENCRYPTION METHOD> and select <ENTRY>.



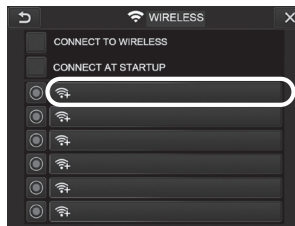
4 When the wireless setting window appears, tilt the [MEAS/ENTER] joystick of the remote control unit to the left to select the access point selection button  and short-press it.

If the access point selection button is lighted, the setting is complete.

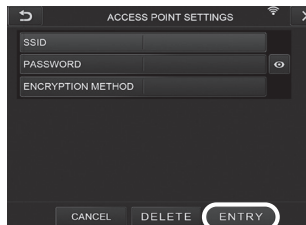



■ When operating with the touch panel

- 1 Select [MENU] - <NETWORK> - <WIRELESS>.
- 2 When the wireless setting window shown below appears, select the blank access point row.

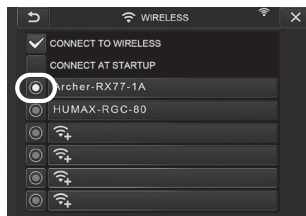


- 3 When the access point setting window appears, input <SSID> and <PASSWORD>. Then, select <ENCRYPTION METHOD> and select <ENTRY>.




- 4 When the wireless setting window appears, touch the access point selection button  of the row where the access point is displayed.

If the access point selection button is lighted, the setting is complete.



3 Connecting to the wireless LAN

- 1 Select [MENU] - <NETWORK> - <WIRELESS> to display the wireless setting window.
- 2 Check the checkbox of the row of <CONNECT TO WIRELESS>.
- 3 If the connection with the access point is made successfully,  is displayed in the upper right area of the window.

When the connection with the access point is in process, the message <CONNECTING> is displayed.

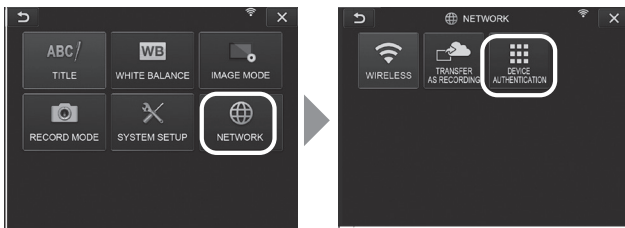
8-2 Device authentication

NOTE

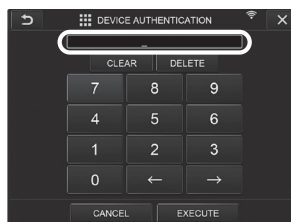
Before performing the operation in this section, be sure to login to the OSC portal site and register the instrument you will use.

For details of registration procedures, refer to the OSC operation method.

- 1 Select [MENU] - <NETWORK> - <DEVICE AUTHENTICATION>.



- 2 When the device authentication window shown below appears, input the PIN code and select <EXECUTE>.

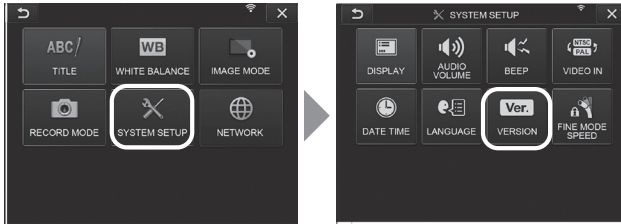


8-3 Updating software

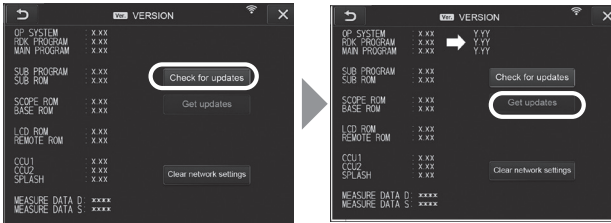
TIP

Be sure to connect the SD card in advance to download the software.

- 1 Select [MENU] - <SYSTEM SETUP> - <VERSION>.

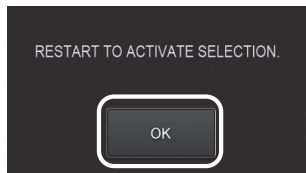


- 2 Pressing [Check for updates] displays the latest version. If there is an updatable version, [Get updates] changes from grayout to normal display. Press [Get updates] to acquire updated data.



- 3 If the acquisition of updated data completes successfully, the dialog shown below appears. Press the [OK] button.

Restart the instrument to complete the settings.



TIP

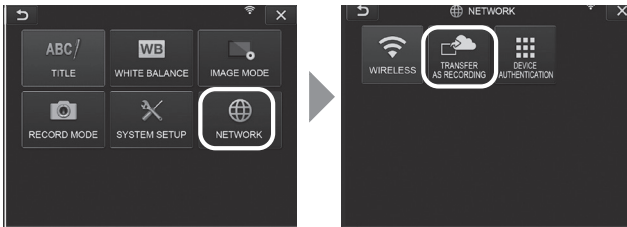
It may be necessary to update twice. If the second update is necessary, [REPEAT UPDATE.] is displayed when performing the first update. Restart the instrument.

8-4 Uploading the image

1 Transfer as recording

You can upload the recorded still image files to the cloud server.

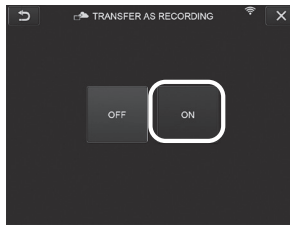
- 1 Select [MENU] - <NETWORK> - <TRANSFER AS RECORDING>.



- 2 When the window shown below appears, select <ON>.

Only still images are uploaded in conjunction with the recording operation.

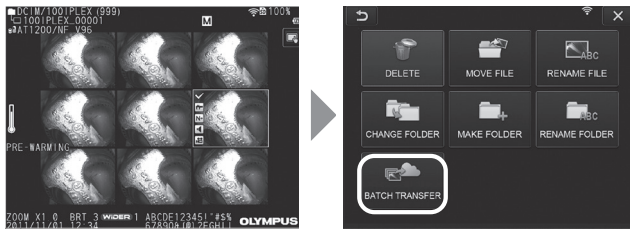
If the print screen function is ON, two files recorded will be uploaded. However, if you fail in uploading the first file, the second file will not be uploaded.



2 Batch transfer

You can upload the still image files saved in the folder to the cloud server by batch.

- 1 Open the folder where the images you want to upload are saved, and select **⟨BATCH TRANSFER⟩** from the thumbnail main menu.



- 2 When the **⟨EXECUTE⟩** button is displayed, press this button to start uploading.

Files in the working folders and files in all subfolders are subject to batch transfer.

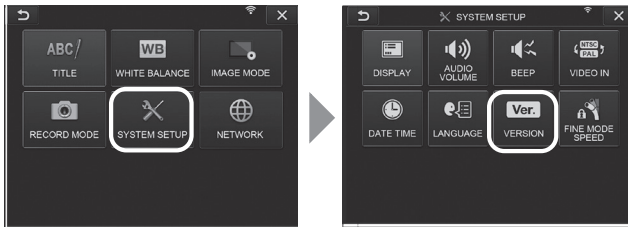


8-5 Initializing the network information

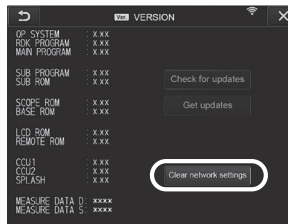
You can initialize the network information specified for this product. When disposing of this product, be sure to perform this operation. The information shown below is initialized by this operation.

- Device authentication information
- Access point information (SSID, PW, encryption method)
- Other various network settings (transfer as recording, etc)

1 Select [MENU] - <SYSTEM SETUP> - <VERSION>.



2 Press [Clear network settings].



3 When the dialog <DO YOU WANT TO INITIALIZE NETWORK SETTINGS?> is displayed, press <YES>.

The network information is initialized.



9 Troubleshooting

Inspect the instrument as described in “3 Pre-operation preparation and inspection” (page 23). If there are any obvious malfunctions, do not use the instrument and contact Evident for repairs. If a slightest irregularity is suspected, do not use the instrument and perform the actions described in “9-1 Troubleshooting guide”. If the problem cannot be resolved by taking the remedial action described, stop using the instrument and contact Evident for repair.

9-1 Troubleshooting guide

1 Error messages



Message	Cause and recommended action
〈NO RECORDING MEDIA〉	The SDHC card or the USB flash drive is not loaded. → Load the SDHC card or the USB flash drive you use and try again. Or turn OFF the instrument and ON again.
〈RECORDING MEDIA FULL〉	The SDHC card or the USB flash drive is full. → Delete the unnecessary data to free up space, or replace with a new SDHC card or a new USB flash drive.
〈THIS IMAGE CANNOT BE RETRIEVED〉	The image is 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 SDHC card or the USB flash drive cannot be recognized. → Format the SDHC card or the SB flash drive with this instrument.
〈THE SPECIFIED FILE NAME ALREADY EXISTS. PLEASE CHOOSE ANOTHER NAME.〉	The file name exists. → Specify the file name other than the existing file name.
〈THE SPECIFIED FOLDER NAME ALREADY EXISTS. PLEASE CHOOSE ANOTHER NAME.〉	The folder name exists. → Specify the folder name other than the existing folder name.
〈RECORDING MEDIA IS LOCKED. PLEASE UNLOCK〉	The SDHC card is locked. → Unlock the SDHC card you will use and insert the SDHC card in this instrument.
〈INCOMPARABLE IMAGE RESOLUTION〉	The resolution of the live image is different from that of the played back image. → Specify the file with the same resolution as the live image.
〈The image cannot be displayed in 3D view. Acquire the stereo image again.〉	The image is not appropriate for 3D view. → Acquire the stereo image again.
〈OVER CURRENT (USB). PLEASE TURN OFF THE POWER.〉	The recommended USB flash drive is not used. → Stop inspection, and turn OFF the instrument and ON again. Use the recommended USB flash drive.
	A USB device other than the USB flash drive is connected. → Disconnect all USB devices other than the USB flash drive.
〈LOW BATTERY. PLEASE CONNECT TO THE AC ADAPTER OR TURN OFF THE POWER.〉	The battery voltage is low. → Stop all operations, such as image recording, copying, deleting and formatting the USB flash drive, etc., and immediately replace the battery. Or connect the AC adapter.



Message	Cause and recommended action
<p><HIGH TEMPERATURE (DISTAL END). PLEASE IMMEDIATELY PULL OUT THE INSERTION TUBE.></p>	<p>The self-check function was activated to prompt termination of inspection because the distal end became too hot. → Immediately pull the insertion tube out of the observation object.</p> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block; margin: 10px 0;">TIP</div> <p>This message will appear before the atmospheric temperature of the distal end reaches the maximum operating ambient temperature.</p>
<p><OVER CURRENT (ARTICULATION MOTOR). PLEASE TURN OFF THE POWER.></p>	<p>The self-check function was activated to prompt termination of operation because the insertion tube is overloaded. → Extend the insertion tube as much as possible to reduce the loop amount, and turn power back on without operating the [ANGLE/LOCK] joystick.</p>
<p><OVER CURRENT (LIGHT SOURCE). PLEASE TURN OFF THE POWER.></p>	<p>The self-check function was activated to prompt termination of operation due to the over current of the light source. → Terminate inspection, allow the instrument to cool down, and then turn power back on again.</p>
<p><COMMUNICATION FAILED.></p>	<p>The instrument is not connected to the wireless LAN. → Check the connection of the wireless LAN. (See "8-1 Connecting to the wireless LAN")</p> <p>The radio wave of the wireless LAN is weak → Move the instrument to the location with good radio wave condition.</p> <p>The PIN code is wrong or the instrument is not registered. → Check on the OSC portal site.</p> <p>Device authentication information is not saved in the main unit. → Cancel the registration of the instrument on the OSC portal site and wait at least 30 minutes then perform the device authentication again.</p>

2

Common problems

Problem	Cause and recommended action
<p>Illumination does not light.</p>	<p>The [LIGHT] button (☞) is not turned ON. → Turn ON the [LIGHT] button (☞).</p>
<p>The optical adapter cannot be attached to the insertion tube.</p>	<p>A foreign object is stuck to the screws. → Wipe with a clean piece of gauze or a cotton swab.</p> <p>The optical adapter in use is not a designated optical adapter for this system. → Use the designated optical adapter.</p> <p>The installation procedure is not correct. → Install the optical adapter again according to the correct procedures (see "3-5 Attaching and removing the optical adapter" (page 31)).</p>
<p>The optical adapter cannot be removed from the insertion tube.</p>	<p>The removing procedure is not correct. → Install the optical adapter again according to the correct procedures (see "3-5 Attaching and removing the optical adapter" (page 31)).</p>

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 (see "3-3 Preparing the power supply" (page 28)).
	The power is not turned ON. → Set the [POWER] button  of the main unit to ON.
	A non-designated AC adapter or battery is connected. → Use the designated AC adapter or battery.
	The scope unit is not attached to the main unit correctly. → Attach the scope unit to the main unit properly.
The system cannot be turned OFF.	The main unit is damaged. → Remove the AC adapter or the battery from the main unit and turn OFF the power.
The image is not sharp.	The objective lens of the distal end of the insertion tube or the optical adapter is dirty. → Wipe with a clean piece of gauze or a cotton swab.
	The optical adapter is not attached correctly. → Attach the optical adapter properly.
	The image sharpness is not adjusted appropriately. → Adjust the image sharpness appropriately (see "4 Adjusting the image sharpness" (page 72)).
	The external monitor is not adjusted appropriately. → Adjust the external monitor appropriately.
The image brightness is not optimal.	The objective lens of the distal end of the insertion tube or the optical adapter is dirty, or the illumination on the optical adapter is dirty. → Wipe with a clean piece of gauze or a cotton swab.
	The automatic brightness control is not set appropriately. → Use the [BRT] button  to adjust to the proper setting.
	The external monitor is not adjusted appropriately. → Adjust the external monitor appropriately.
	The optical adapter is loose. → Attach the optical adapter properly (see "3-5 Attaching and removing the optical adapter" (page 31)).
Color reproduction is poor.	The white balance is not set properly. → Adjust white balance again.
	The image color is not adjusted appropriately. → Adjust the image color appropriately (see "5 Adjusting the image saturation" (page 72)).

Problem	Cause and recommended action
The noise is noticeable on the image.	The automatic brightness control is not set appropriately. → Use the [BRT] button  to adjust it to the appropriate setting.
	The noise reduction is not adjusted appropriately. → Adjust the noise reduction to the appropriate setting in «NOISE REDUCTION» in the «IMAGE MODE» menu.
The screen is not displayed. (The screen is not displayed properly)	Set the [POWER] button  of the main unit to OFF and set the [POWER] button to ON again to restart the instrument.
	The scope unit is not attached to the main unit correctly. → Attach the scope unit to the main unit properly.
The operation beep is not heard.	«BEEP» in the «SYSTEM SETUP» menu is set to «OFF». Set «BEEP» in the «SYSTEM SETUP» menu to «ON».
All functions stopped during recording the movies.	The SDHC card being used for image recording is not the one provided and is not the one recommended by Evident. → Remove the AC adapter or the battery from the main unit and turn OFF the power. → Use the SDHC card for recording images provided as standard or the one recommended by Evident.
The stereo measurement function does not start.	The combination of the stereo optical adapter and the stereo scope unit is not correct. → Check that the combination of Serial No. of the stereo optical adapter and Serial No. of the stereo scope unit is correct.
The measurement result of the scaler measurement is not displayed.	The image acquired by unsupported software version (1.20 or before) is used. → Use the image acquired by the software version 1.20A or after.

9-2 Requesting repair of this product

Contact Evident when you request 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 repaired 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. Evident will not repair an instrument contaminated by noxious substances.

NOTE

If the main board of this product is replaced due to repair, cancel the registration of the instrument before repair on the OSC portal site. Then, register the information of the instrument after repair again and perform the device authentication. Note that if the instrument information is not registered again, you cannot use the network function.

10 Storage and maintenance

10-1 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 Evident about changing the battery.

For details about how to load and remove the battery, see “1 Using the battery” (page 28).

10-2 Replacing the O-ring

Apply the silicon grease to the spare O-ring provided with the optical adapter and replace it. Replace the O-ring periodically.

The position to attach the O-ring differs between 6-mm type, 4-mm type and 6.2-mm type. Refer to “2-2 Distal end/optical adapter nomenclature” (page 19) and “3-5 Attaching and removing the optical adapter” (page 31), and attach the O-ring at the correct position.

10-3 Cleaning components

1 Cleaning the insertion tube

Dirt or other foreign objects 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 it with a soft cloth or cotton swab, and then wash thoroughly with a piece of gauze or other material moistened with a neutral detergent. Then, use a clean, soft piece of soft gauze moistened with clean water, and wipe the insertion tube to dry all moisture.

NOTE

Clean the insertion tube immediately after pulling out the insertion tube. Leaving the insertion tube very dirty for a long period can cause it to become corroded.

2

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 droplets.

You could also use the brush to brush away dirt and water droplets.

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



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

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

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

3

Cleaning the optical adapter

Dirt or water droplets on the outer surface of the optical adapter or 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.

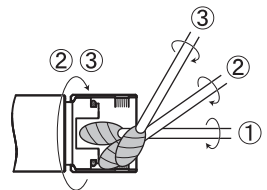
Cleaning dirt from the optical adapter outer surface while it is attached to the distal end

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

Dirt on the threads of screws of the optical adapter

Moisten a cotton swab with a commercially available absolute ethanol or isopropyl alcohol, and keep cleaning in the sequence ①, ②, ③ as shown in the picture on the right until no dirt is left on the cotton swab.

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



NOTE

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

4 Cleaning the hook assembly

NOTE

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

- 1 Remove the hook assembly by reversing the procedure steps described in section “3-10 Attaching the hook assembly” (page 37).
- 2 If the hook assembly is contaminated by soil or oil, wash it away with a cleaning fluid such as neutral detergent, rinse well and dry completely.

5 Cleaning the LCD monitor

LCD monitor viewing problems due to fingerprints and dirt

Wipe the LCD monitor with a soft cloth moistened with clean water. Then, lightly wipe it with a clean and dry cloth.

NOTE

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

6 Cleaning of other units

If the main unit is dirty, wipe it with a soft cloth moistened with clean water. Then, lightly wipe it with a clean, dry cloth. Also, wipe the dirt and water droplet completely from the battery cover, inside of the connector cover, connection area of the remote control unit and the main unit, and the connection area of the scope unit and the main unit.

10-4 Storage precautions

Store this product under normal room temperature and humidity.

1 Storing the instrument in the carrying case

For procedures to store the instrument in the carrying case, refer to the label which describes the storing procedures, attached to the inner surface of the top lid of the carrying case.

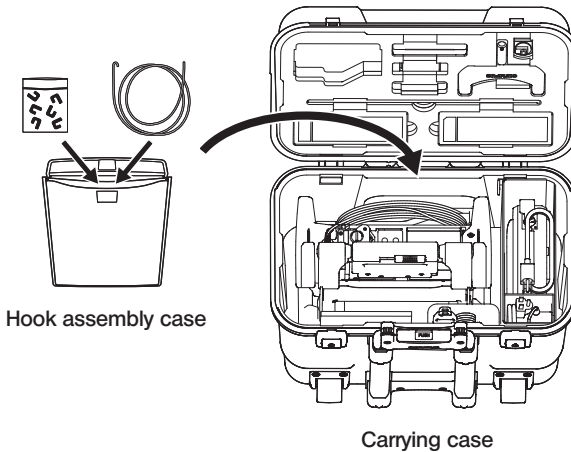
NOTE

- 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, the cable may be damaged, which can cause fire and electric shock.
- Do not store the instrument in the carrying case with the shoulder strap attached. Otherwise, the LCD monitor may be scratched or the shoulder strap may be damaged.

- 1 Turn OFF the power and remove the battery or unplug the AC adapter.
- 2 Wind the insertion tube around the drum and store it in the drum case. And store the instrument in the carrying case according to the illustration on the packing instruction label.
- 3 Store the instrument on a level surface in a clean, dry and stable place.

2 Storing the hook assembly

- 1 Take out the hook assembly case from carrying case.
- 2 Wind the hook assembly and place it in the hook assembly case.
(Two hook assemblies can be stored in the hook assembly case.)
- 3 Store the spare hook in the hook assembly case as well.
- 4 Store the hook assembly case on the rear side of the main unit.



10-5 Recalibration of check tools

Since the shape of the check tool is physically fixed, the dimensions of the indicator on the check tool do not change unless the check tool is deformed or gets dirty. However, the dimensions may change due to deterioration or damage of the check tool depending on storage, transportation, and usage statuses.

The periodic calibration of check tools is recommended to secure the validity of measurement results. For the periodic calibration, refer to ISO9001.

The customer is responsible for deciding the calibration cycle (interval) depending on your usage status and required accuracy.

For your reference, Evident sets the calibration cycle of two to three years for the standard instrument stored as the master instrument and one year for the measurement instrument used on a daily basis.

Evident ensures that the product functionality is not impaired when the products are stored in warehouse and transported in a packaged state by conducting the tests. Therefore, the date to start counting for the first calibration date after delivering the check tool can be set to the delivery date, same as the start date of product warranty period. For example, even though the date shown on the calibration label of the delivered check tool is January, if it is delivered in July and the calibration cycle is specified as 12 months, the calibration deadline can be set to July of the following year.

Contact Evident for calibration request.

11 Specifications

11-1 Operating environment

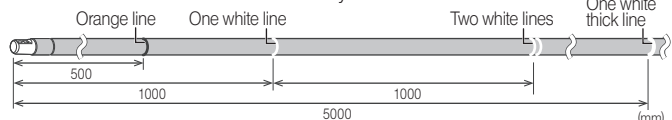
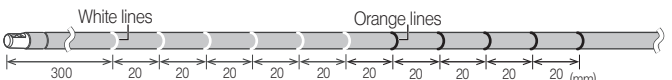
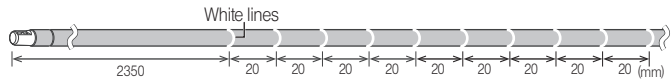
Item	Specifications
Operating temperatures	
Insertion tube	In air : -25 to 100 °C In water : 10 to 30 °C
Parts other than insertion tube	In air : -21 to 49 °C (Battery-powered operation) 0 to 40 °C (AC adapter-powered operation)
Operating atmospheric pressure	
Insertion tube	In air : Normal pressure (1,013 hPa) In water: IV94 series 1,013 to 1,513 hPa (up to water depth 5.0 m) IV96 series 1,013 to 1,772 hPa (up to water depth 7.5 m)
Parts other than insertion tube	In air : Normal pressure (1,013 hPa)
Operating environment altitude	
All parts	Up to altitude 2,000 m
Operating environment humidity	
All parts	15 to 90 % (relative humidity)
Liquid resistance	
Insertion tube	No problem even if exposed to machine oil, light oil or 5 % saline solution.
Other parts than insertion tube	
Waterproofing	
Insertion tube	IV9●●●●N, V9●●●●N-MD, IV9●●●●N-MDS Waterproof construction. Can be used underwater with the optical adapter attached. The stereo measurement is not available underwater. IV9635X1N, IV9635X1N-MD, IV9635X1N-MDS Use underwater is not supported.
Parts other than insertion tube	Water resistant proof construction. Use underwater is not supported. The instrument is not water-resistant if the battery cover or other covers are open.
Pollution Degree	
All parts	2 (Including AC adapter)
Installation (overvoltage) category	
All parts	II

NOTE

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

11-2 Other specifications

1 Other specifications

Item	Specifications
Optical system	
For optical adapter specifications, see "11-3 Optical adapter specifications" (page 120).	
Illumination	The white light in the scope unit is guided to the distal end of the insertion tube via the light guide.
Distal end	
Outer diameter	IV94 series: Ø4.0 mm IV96 series: Ø6.0 mm, Ø6.2 mm
Distal end rigid section length	See the specifications of the distal end rigid section length of the optical adapter.
Angulation	IV9435N, IV9450N, IV9635X1N: 130 ° * IV9635N, IV9650N: 180 ° * * UP, DOWN, RIGHT and LEFT direction IV9675N: 150 ° * (When the insertion tube is straight.)
Flexible section	
Flexibility	IV94 series: Fixed hard corrugated tube from the distal end of the insertion tube to the scope unit IV96 series: TF corrugated tube with flexibility gradually increasing toward the distal end of the insertion tube
Outer diameter	IV94 series: Ø4.0 mm IV96 series: Ø6.0 mm, Ø6.2 mm
Index lines	<p>IV94 series, IV96 series (except IV9635X1N)</p> <p>An orange line is displayed at the position of 500 mm from the distal end of the insertion tube.</p> <p>White lines are displayed at every 1000 mm from the distal end of the insertion tube. The number of white lines is increased at every 1000 mm (1 line at 1000 mm, 2 lines at 2000 mm).</p> <p>One white thick line is displayed at the position of 5000 mm from the distal end of the insertion tube. Beyond 5000 mm, the white line is added to the white thick line at every 1000 mm.</p>  <p>IV96 series (IV9635X1N only)</p> <p>Six white lines and five orange lines are displayed from the position of 300 mm from the distal end of the insertion tube at intervals of 20 mm.</p>  <p>10 white lines are displayed from the position of 2350 mm from the distal end of the insertion tube at intervals of 20 mm.</p> 

Item	Specifications
Total length	IV9435N, IV9635N, IV9635X1N: 3.5 m IV9450N, IV9650N: 5.0 m IV9675N: 7.5 m
Remote control unit	
Dimensions	39(W) x 137(H) x 40(D) mm (without insertion tube and cables)
Weight (including cables and connectors)	0.2 kg
Main unit	
Dimensions	320(W) x 310(H) x 180(D) mm
Weight	3.9 kg
Weight (including battery and SDHC card)	IV9435N: 7.1 kg IV9450N: 7.2 kg IV9635N: 7.3 kg IV9635X1N: 7.5 kg IV9650N: 7.4 kg IV9675N: 7.6 kg
LCD panel	8.4 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: Made by IDX, NP-L7S Nominal voltage: DC14.8 V Nominal capacity: 68 Wh Battery powered operating time: Approximately 100 minutes (based on new battery) For details, refer to the instruction manual of your battery charger.
AC adapter for main unit	Model: Made by SINPRO, SPU61A-107-P25G001-OSC Input voltage: 100 V to 240 V AC \pm 10% Frequency: 50/60 Hz Output voltage: 16 V DC
Battery charger	Model: Made by IDX, JL-2PLUS Input voltage: 100 V to 240 V AC Frequency: 50/60 Hz For details, refer to the instruction manual of the battery charger.
Power consumption	45 W
Recording media	SDHC card and USB flash drive (For recommended products, please contact Evident.)



Item	Specifications
Still image recording	
Resolution	IV94 series, IV96 series (IV9635X1N only): H768 x V576(Pixel) IV96 series (except IV9635X1N): H1024 x V768 (Pixel) External input NTSC: H640 x V480(Pixel) External input PAL: H768 x V576(Pixel)
Recording format	Files are stored as compressed JPEG format (Exif 2 compliant).
Still image playback	
Restrictions	Images recorded on the instrument can be played back.
Movie recording	
Resolution	IV94 series, IV96 series (IV9635X1N only): H768 x V576(Pixel) IV96 series (except IV9635X1N): H1024 x V768 (Pixel) External input NTSC: H640 x V480(Pixel) External input PAL: H768 x V576(Pixel)
Recording format	MPEG-4 AVC(H.264) formats. Can be played back on the Windows Media Player. (Windows Media Player 12 or later must be installed.)
Movie playback	
Restrictions	Images recorded with the instrument can be played back.
Movie output	
Format	Analog VGA output
Resolution	H1024 x V768 (Pixel)
Frame rate	60 fps
Manufacturer	Evident Corporation Tokyo, Japan

TIP

- The images recorded with the instrument can be played back on a computer, etc., but the images recorded with image recording devices such as a digital camera or a personal computer cannot be played back with the instrument.
- All brands are Trademark or registered Trademark of their respective owners.

2

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 · Immunity Industrial electromagnetic environment <p>Emissions exceeding the level required by aforementioned standards may occur if this product is electrically connected to other equipment. Some interference may occur if this product is used in residential environments.</p>
FCC Information	<p>This product conforms to the following.</p> <ul style="list-style-type: none"> · NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. · FCC WARNING Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
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3

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11-3 Optical adapter specifications

1 For 4-mm type insertion tube

When the optical adapter (optional) is mounted on the insertion tube.

Adapter name		AT120D/NF -IV94	AT120D/FF -IV94	AT100S/NF -IV94N	AT100S/FF -IV94N
Product abbreviation		A120N	A120F	A100N	A100F
Character color		Red	Green	Red	Green
Optical system	Field of view	120°	120°	100°	100°
	Direction of view	Forward view	Forward view	Side-view	Side-view
	Depth of field* ¹	2 to 200 mm	17 to ∞ mm	2 to 15 mm	8 to ∞ mm
Distal end	Outer diameter* ²	Ø4.0 mm	Ø4.0 mm	Ø4.0 mm	Ø4.0 mm
	Rigid distal end length* ³	20.2 mm	20.1 mm	22.9 mm	22.9 mm

Adapter name		AT80D/FF -IV94N	AT70D/70D -IV94N	AT50S/50S -IV94N
Product abbreviation		A80F	A70/70	A50/50
Character color		Green	Blue	Blue
Optical system	Field of view	80°	70°/70°	50°/50°
	Direction of view	Forward view	Forward view	Side-view
	Depth of field* ¹	35 to ∞ mm	5 to 200 mm	3 to 150 mm
Distal end	Outer diameter* ²	Ø4.0 mm	Ø4.0 mm	Ø4.0 mm
	Rigid distal end length* ³	20.1 mm	22.3 mm	26.7 mm

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

*² Can be inserted into a Ø4.0 mm hole when mounted on the insertion tube.

*³ Indicates the length of the rigid portion of the distal end when mounted to the insertion tube.

2 For 6-mm type insertion tube

When the optical adapter (optional) is mounted on the insertion tube.

Adapter name		AT50D/FF -IV96N	AT80D/FF -IV96N	AT120D/NF -IV96N	AT120D/FF -IV96N
Product abbreviation		A50F	A80F	A120N	A120F
Character color		White	Green	Red	Green
Optical system	Field of view	50°	80°	120°	120°
	Direction of view	Forward view	Forward view	Forward view	Forward view
	Depth of field* ¹	50 to ∞ mm	20 to ∞ mm	7 to 300 mm	19 to ∞ mm
Distal end	Outer diameter* ²	Ø6.0 mm	Ø6.0 mm	Ø6.0 mm	Ø6.0 mm
	Rigid distal end length* ³	21.3 mm	21.3 mm	21.4 mm	21.4 mm

Name		AT120S/NF -IV96N	AT120S/FF -IV96N	AT90D/90D -IV96N	AT70S/70S -IV96N
Product abbreviation		A120N	A120F	A90/90	A70/70
Character color		Red	Green	Blue	Blue
Optical system	Field of view	120°	120°	90°/90°	70°/70°
	Direction of view	Side-view	Side-view	Forward view	Side-view
	Depth of field* ¹	4 to 150 mm	20 to ∞ mm	5 to 250 mm	4 to 250 mm
Distal end	Outer diameter* ²	Ø6.0 mm	Ø6.0 mm	Ø6.0 mm	Ø6.0 mm
	Rigid distal end length* ³	26.6 mm	26.6 mm	25.0 mm	31.2 mm

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

*² Can be inserted into a Ø6.0 mm hole when mounted on the insertion tube.

*³ Indicates the length of the rigid portion of the distal end when mounted to the insertion tube

3 For 6.2-mm type insertion tube

When the optical adapter (optional) is mounted on the insertion tube.

Adapter name		AT80D -IV96X1N	AT120D/NF -IV96X1N	AT120D/FF -IV96X1N	AT80S -IV96X1N
Product abbreviation		A80	A120N	A120F	A80
Character color		Black	Red	Green	Black
Optical system	Field of view	80°	120°	120°	80°
	Direction of view	Forward view	Forward view	Forward view	Side-view
	Depth of field*1	35 to ∞ mm	2 to 200 mm	17 to ∞ mm	30 to ∞ mm
Distal end	Outer diameter*2	Ø6.2 mm	Ø6.2 mm	Ø6.2 mm	Ø6.2 mm
	Rigid distal end length*3	20.6 mm	20.6 mm	20.5 mm	24.4 mm
Adapter name		AT120S -IV96X1N	AT70D/70D -IV96X1N	AT60S/60S -IV96X1N	
Product abbreviation		A120	A70/70	A60/60	
Character color		Black	Blue	Blue	
Optical system	Field of view	120°	70°/70°	60°/60°	
	Direction of view	Side-view	Forward view	Side-view	
	Depth of field*1	8 to ∞ mm	5 to 200 mm	3 to 150 mm	
Distal end	Outer diameter*2	Ø6.2 mm	Ø6.2 mm	Ø6.2 mm	
	Rigid distal end length*3	24.4 mm	22.7 mm	28.3 mm	

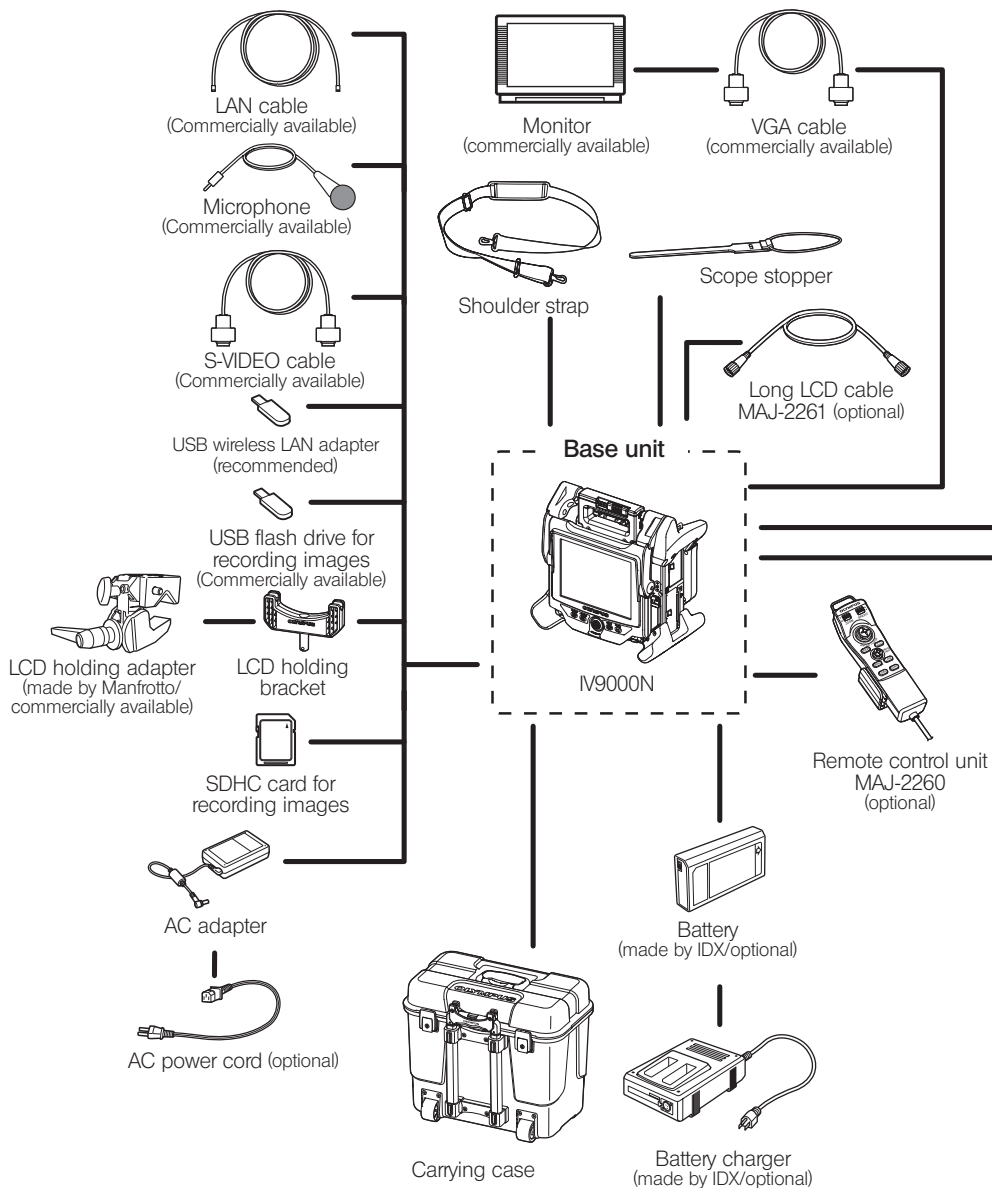
*1 Indicates the range within which the image can be viewed clearly.

*2 Can be inserted into a Ø6.2 mm hole when mounted on the insertion tube.

*3 Indicates the length of the rigid portion of the distal end when mounted to the insertion tube.

Appendix

System chart



Stereo scope unit (optional)



4-mm type

- IV9435N-MD*
- IV9450N-MD*
- IV9435N-MDS**
- IV9450N-MDS**

6-mm type

- IV9635N-MD*
- IV9650N-MD*
- IV9675N-MD*
- IV9635N-MDS**
- IV9650N-MDS**
- IV9675N-MDS**

6.2-mm type

- IV9635X1N-MD*
- IV9635X1N-MDS**

The following check tools are included with stereo scope unit.

4-mm type (In case of addition MAJ-2265)

6-mm type (In case of addition MAJ-2264)

6.2-mm type (In case of addition MAJ-2414)



* The following optical adapters are included with MD.

4-mm type AT70D/70D-IV94N

6-mm type AT90D/90D-IV96N

6.2-mm type AT70D/70D-IV96X1N

** The following optical adapters are included with MDS.

4-mm type

• AT70D/70D-IV94N • AT50S/50S-IV94N

6-mm type

• AT90D/90D-IV96N • AT70S/70S-IV96N

6.2-mm type

• AT70D/70D-IV96X1N • AT60S/60S-IV96X1N

The following items are included with stereo scope unit and scope unit.

6.2-mm type

• Hook assembly case • Channel port grip

• Hook assembly

(In case of addition MAJ-1245)



• Hook (In case of addition MB-910(B))

• Access port grip (In case of addition MAJ-2500)

• Belt clamp



Scope unit (optional)



4-mm type

- IV9435N
- IV9450N

6.2-mm type

- IV9635X1N

6-mm type

- IV9635N
- IV9650N
- IV9675N



Scope case (optional)

4-mm type, 6-mm type

- MAJ-2262

4-mm type, 6-mm type and 6.2-mm type

- MAJ-2501



Optical adapter (optional)

4-mm type

- AT120D/NF-IV94N
- AT120D/FF-IV94N
- AT100S/NF-IV94N
- AT100S/FF-IV94N
- AT80D/FF-IV94N

6-mm type

- AT50D/FF-IV96N
- AT80D/FF-IV96N
- AT120D/NF-IV96N
- AT120D/FF-IV96N
- AT120S/NF-IV96N
- AT120S/FF-IV96N

6.2-mm type

- AT80D-IV96X1N
- AT120D/NF-IV96X1N
- AT120D/FF-IV96X1N
- AT80S-IV96X1N
- AT120S-IV96X1N



Rigid sleeve (optional)

4-mm type


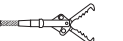



- MAJ-1737

6-mm type, 6.2-mm type

- MAJ-1253

Retrieval tools (optional)

6.2-mm type

- Snare MAJ-1353 
- Alligator MAJ-1354 
- Basket MAJ-1355 
- Grasper MAJ-1356 
- Magnet MAJ-1357 

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