INSTRUCTIONS

IPLEX G Lite
IPLEX G Lite-W

INDUSTRIAL ENDOSCOPE

IV9420GL
IV9435GL
IV9620GL
IV9635GL
IV96100GL
IV9420GL-W

Industrial Endoscope

Contents

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.

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 115) 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.

Expanded functionality of the IPLEX G Lite series

Stereo measurement function can be used by purchasing the necessary options.

IPLEX G Lite → IPLEX G Lite (stereo measurement) GL ST

> TIP
>
> Symbol in the text
> GL ST : Functions usable with IPLEX G Lite (stereo measurement)

Contact Evident for more details.

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.

NOTICE or (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 the 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 present
  Otherwise, 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.

⚠ WARNING

• **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.
• **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.
• **The gas tube must not be used for grounding.**
  Otherwise, it may cause an explosion.

⚠ 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.
• **Note the following precautions when moving this unit to or using it at an elevated location.**
  – Conduct a prior inspection
  – Take measures to prevent the unit from falling off
  – Implement thorough safety measures
• **Pay careful attention to the temperature of the distal end and the insertion tube right after using this instrument in high temperature environments as the temperature does not cool down immediately.**
  Otherwise, you may get burned.
• **Do not grip the control for a prolonged period of time when using the unit under a high temperature.**
  Otherwise, it may cause low-temperature burns. Take precautionary measures such as wearing protective gloves to prevent low-temperature burns.
• **Pay attention not to trip over the power cord or cables of the insertion tube.**
• **Do not use commercially-sold electronic transformers for overseas travel use (travel converters).**
• **Use only the power cord and the AC adapter specified by Evident and connect the power cord to the 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, the malfunction or damage may be caused and result in electric shock.

⚠ **CAUTION**

- **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.
- **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 by 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.
    - ⁻ Do not tilt or strongly scratch the distal end of the insertion tube against the retention hole for the distal end of the insertion tube when inserting or removing the distal end.
    Otherwise, 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 abnormality is found in the observation image, stop using immediately and pull out the insertion tube from the inspection object carefully.**
    If the optical adapter is about to fall off the distal end of the insertion tube while it is being inserted into the inspection object, the entire or a part of the observation image will appear whitish due to light of the illumination, or a part of the view may be lost. Continued use in this condition may cause the optical adapter to fall off from the distal end of the insertion tube. In this case, pull out the insertion tube carefully from the inspection object and attach the optical adapter firmly again according to "Attaching and removing the optical adapter" (page 27).

⚠ CAUTION

- **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 this unit from your neck 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 the parts other than the insertion tube underwater or clean them under running water.**
  Otherwise, water creates the risk of electric shock. Other than the insertion tube, the unit is waterproof when the DC-IN terminal cap, and the doors of the battery compartment and other interfaces are tightly closed. Do not use or store the instrument in an environment where it is submerged in water.
- **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.
- **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 microSDHC card 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 microSDHC card continuously.**
  Otherwise, the recorded data or the image recording media may be damaged or may not function properly.

⚠ CAUTION

- **Note the following precautions when the illumination is turned ON.**
    - Do not leave the distal end of the insertion tube near the flammable substances for a long time.
    - The light goes off during replacement of the optical adapter.
    - Do not stare at the light emitted from the distal end.
      When using a UV LED unit or IR LED unit, check that the LED icon (/ /) lights up on the live screen or other screens.
    - When used in combination with the LED guide tube, please read through "Safety Precautions - Precautions Concerning the Illumination" in the instruction manual of the LED guide tube to ensure its proper use.
    - Use the equipment in accordance with the regulations for Workers Health and Safety, if any.

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.
  - **NOTICE** : UV emitted from this Product. Minimize exposure to eyes or skin. Use appropriate shielding.
  - **NOTICE** : IR emitted from this Product. Use appropriate shielding or eye protection.

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.
- **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 compartment door and interface doors.**
  - ⁻ Do not open or close the doors when there is water on the surrounding surfaces
  - ⁻ 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 with regard to the terminals on this unit and those on the LED unit.**
  - ⁻ Do not touch the terminals directly with your hands
  - ⁻ Prevent dirt and water droplets from coming in contact with the terminals.
- **Note the following precautions when taking out the instrument from the carrying case.**
  - ⁻ When taking out the main unit, do not hold it up with the insertion tube.
  The instrument may be damaged.
- **Do not pull the insertion tube and other cables with force or carry them around.**
- **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.
  - ⁻ Make sure that the insertion tube is not twisted before storing it.
- **Do not lift the carrying case when the cover of the case is not closed.**
- **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 - Precautions concerning cybersecurity -

⚠ CAUTION

- **Configure the security settings when using the network[1]**
  Install firewalls or intrusion detection/prevention systems as part of the measures to prevent illegal access from external sources. Please note that we shall not be liable for any damages that are incurred by our users as a result of illegal access from external sources.
- **Do not disclose the password to anyone other than the user[1]**
  Do not disclose the password to any party other than the user. Please note that we shall not be liable if events such as leakage of information has occurred due to failure to meet this requirement.
- **Manage this unit and the recorded image data[1]**
  Manage this unit and the image data recorded by it, and take measures to prevent theft and tampering of image data from external sources. Please note that we shall not be liable for any damages suffered by the users arising from infringements due to failure to meet this requirement.
- **Erase all information recorded on this unit before discarding or transferring ownership to another party**
  To prevent misuse of any information, please refer to "4-13 Displaying live images on the mobile terminal" for steps to erase the recorded information before discarding the unit or transferring its ownership to another party.

  [1] Items related to IPLEX Image Share and ViSOL Desktop.

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.

⚠ DANGER

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.
- **Use the battery BLH-1 and charge the battery using this unit or the charger BCH-1.**
- **Do not use the battery charger outdoors.**
    Otherwise, the electric shock, smoke or fire may occur, which may cause the damage to the charger.
    The battery charger is designed for indoor use.
- **Do not subject the battery to strong impact.**
- **Do not allow terminals to be short circuited with metal objects.**
- **Do not throw the battery into fire or subject it to heat.**
- **Do not open or modify the battery.**

⚠ WARNING

- **Do not cover the battery charger with clothing, bedding or other materials while charging.**
- **After charging is complete, always be sure to unplug the AC power cord of the charger from the electrical outlet.**
- **If you sense any abnormality such as heat generation, abnormal odor, abnormal noise or smoke, disconnect 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 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 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.**
- **If liquid leaking from the battery comes into contact with your body, rinse it off immediately with clean water from the tap, etc. and seek medical attention if necessary.**

⚠ 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 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.
- **Do not store the battery in the following locations.**
  - Environments exposed to water, high temperature, high humidity, low humidity and dust
  - Locations exposed to direct sunlight or radiation
  - Locations exposed to gas containing halide[1]
    - [1] The performance of some electrical parts may deteriorate due to gas containing halide in insecticides, pesticides and gaseous extinguishing agents, etc.
- **Do not use, charge or store the battery in areas exposed to direct sunlight, in a closed automobile in the sun, or near a heater, etc.**
- **Do not use a battery if it shows any irregularity such as fluid leak, discoloration, deformation, abnormal odor or other abnormality.**
- **Do not immerse the battery in fresh water or sea water, or allow the battery to get wet.**
- **When disposing of a battery, be sure to do so in accordance with all local laws, rules, and regulations.**

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.
- Temperature range for Li-ion battery operation
  - Discharge (when using this unit): -10 °C to 40 °C
  - Charging : 0 °C to 40 °C
  - Storage : -10 °C to 45 °C (Recommended: 20 °C)
  Using the battery under a 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.

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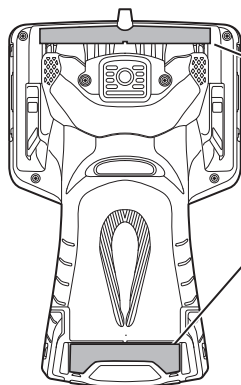
■ Conformity label

■ Rating, model, serial number, precautions
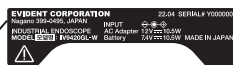
⚠ **CAUTION**

Possibly hazardous optical radiation emitted from this product. (See page 6)

About the IV9420GL-W

The IV9420GL-W unit is used exclusively for forward view. The optical adapter is not replaceable.
The following items below described in this manual are not applicable to the IV9420GL-W.

- Items related to optical adapter
- Items related to stereo measurement (scaler measurement is possible)

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
Main unit	1
SDHC card (inserted into the SDHC card slot of the main unit)	1
AC adapter	1
Hand strap	1
HDMI cable	1
Battery	1
Insertion tube fastening strap	1
Optical adapter case[*2]	1
Tip cap	1
Lens cleaning kit (cotton swab, brush)	1
Microfiber cloth[*3]	1
Model number identification sticker	1
Instruction manual	1
Carrying case	1

*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.

*2 The IV9420GL-W does not come bundled with this product.

*3 Only the IV9420GL-W come bundled with this product.

1   Storing the optical adapter case

The optical adapter case can be used to store the following items.

- Optical adapter
- SDHC card (optical data media)
- O-ring (kept in a bag)
- Tip cap

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.

SDHC card

O-ring

Optical adapter

Tip cap
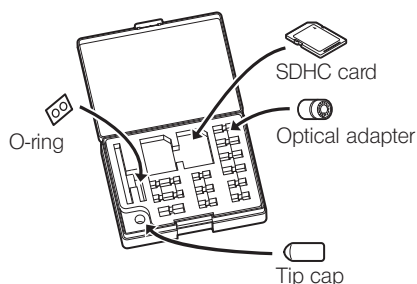
2 Options

· Stereo optical adapter

Name	Quantity
Stereo optical adapter	1
Optical data media	1
O-ring	6
Stereo measurement reference guide	1
Check tool	1
Check tool calibration certificate	1
Instruction manual	1

· Optical adapter

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

Refer to "System chart" (page 115) for information on other options.

2 Nomenclature

2-1 Nomenclature
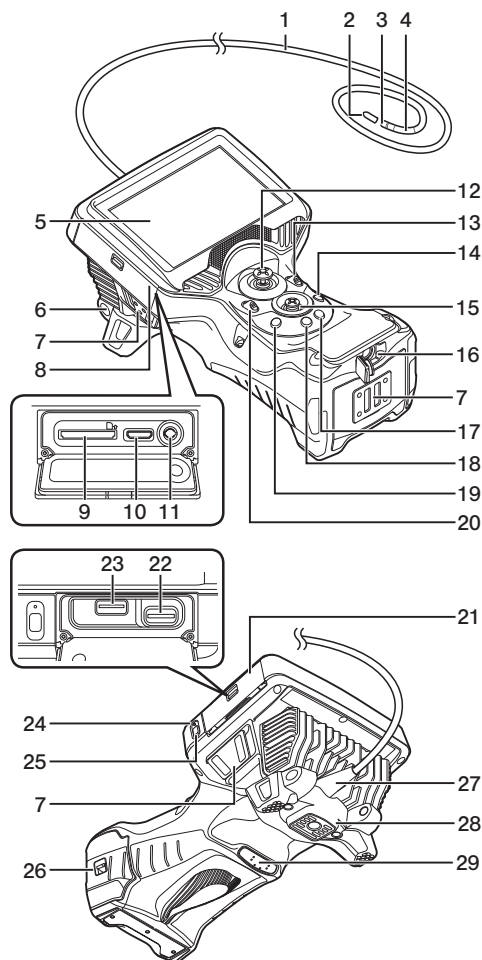
No.	Name
1	Insertion tube
2	Tip cap
3	Distal end
4	Angulation section
5	LCD monitor
6	Retention hole for distal end of insertion tube
7	Strap holder
8	Interface door 1
9	SDHC card slot
10	HDMI mini terminal
11	Headset terminal
12	ANGLE/LOCK joystick
13	ZOOM lever
14	LIVE button
15	MEAS/OK joystick
16	DC-IN terminal
17	CENT button
18	VIEW button
19	MENU button
20	BRT lever
21	Interface door 2
22	microSDHC card slot
23	USB connector
24	Charging indicator
25	POWER button (⏻)
26	Battery door
27	Bend stopper
28	Tripod mounting hole
29	FRZ/REC button

2-2 Distal end/optical adapter nomenclature

4-mm type

● Distal end
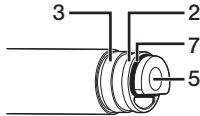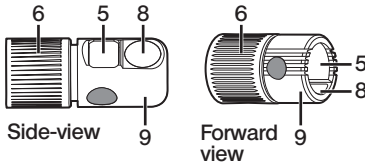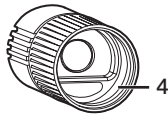
3 — 2
7
5

● Optical adapter,
stereo optical adapter

6   5   8   6
5
8

Side-view   9   Forward   9
view

● Optical adapter internal view

4

6-mm type

● Distal end

4 — 7
1
5

● Optical adapter,
stereo optical adapter

6   5   8   6   5

Side-view   9   Forward   9 8
view

● Optical adapter internal view

10
3
2
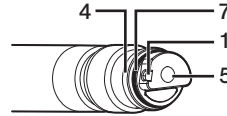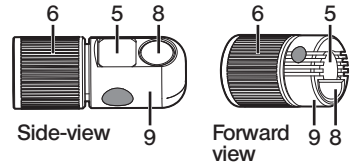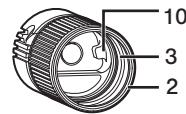
No.	Name
1	Optical adapter positioning groove
2	First screw thread
3	Second screw thread
4	Connecting screw thread
5	Objective lens

No.	Name
6	Nut
7	O-ring
8	Illumination
9	Product name abbreviation*1 and serial number (set number)*2
10	Positioning pin

*1 For information about the product name abbreviation, see "Optical adapter specifications" (page 112).

*2 The serial number of the stereo optical adapter is described as set number in "Registering/re-registering a stereo optical adapter" (page 79) and "Selecting a registered stereo optical adapter" (page 84).

*3 The IV9420GL-W unit is used exclusively for forward view. The optical adapter is not replaceable.

2-3 LCD monitor nomenclature

Live screen
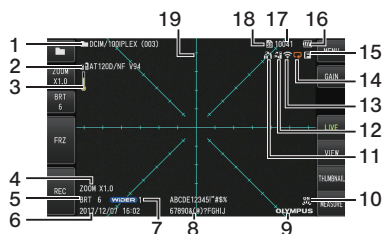
● During ZOOM adjustment
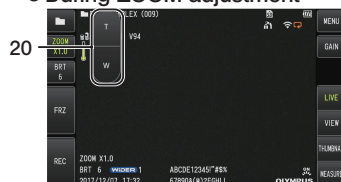
● During BRT adjustment

Freeze screen
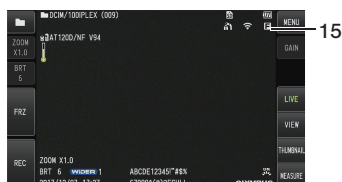
No.	Icon/Indicator	Name
1	-	Folder name
2	-	Optical adapter name
3	🌡	Distal end temperature indicator
4	-	Zoom level
5	-	Brightness level
6	-	Date/Time
7	WiDER / Manual	Gain mode icon
8	-	Title
9	-	Logo
10	ON / ECO / OFF	LED icon
11	🔒	Angle lock icon
12		Angle centering icon
13	📶	Wireless LAN icon
14		Constant video recording icon
14	●	Movie recording in progress icon
14	🎤	Sound recording in progress icon
15	Ⓕ	Freeze icon
16	🔋	Battery indicator
17	-	Number of recordable images
18	SD	SD card icon
19	-	Grid
20	-	Zoom level button
21	-	Brightness level button

> **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 "Storage and maintenance" (page 103).

Live screen (touch panel buttons)
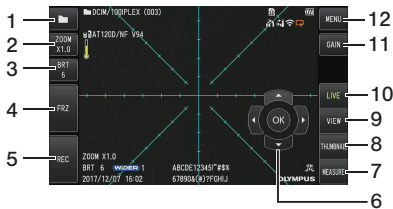
● During movie recording
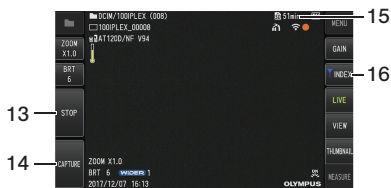
No.	Button name	Function
1	**FOLDER**	Hides or displays the MEAS/OK button (No. 6)
2	**ZOOM**	Hides or displays the zoom level buttons (T, W)
3	**BRT**	Hides or displays the brightness level buttons (+, -)
4	**FRZ**	Switches between the live image and frozen image
5	**REC**	Records movie on the live screenRecords still image on the freeze screen

No.	Button name	Function
6	**MEAS/OK**	For switching between folders
7	**MEASURE**	Moves to the spot ranging screen when stereo measurement is possible, and to the scaler measurement screen in all other cases
8	**THUMBNAIL**	Moves to the thumbnail screen
9	**VIEW**	Moves to the view screen
10	**LIVE**	Moves to the live screen when in the freeze screen mode
11	**GAIN**	Switches the gain mode
12	**MENU**	Displays the different menus
13	**STOP**	Ends movie recording
14	**CAPTURE**	Records still image during movie recording
15	**-**	Switches between the remaining movie recording time and elapsed time
16	**INDEX**	Adds index mark during movie recording

Thumbnail screen

No.	Icon/Indicator	Name
1	-	Folder name
2	-	File name
3	(thermometer icon)	Distal end temperature indicator
4	**N+**	Note icon
5	-	Optical adapter name
6	(movie icon)	Movie icon
7	-	Zoom level
8	-	Brightness level
9	-	Date/Time

No.	Icon/Indicator	Name
10	WiDER / Manual	Gain mode icon
11	-	Title
12	-	Logo
13	ON / ECO / OFF	LED icon
14	(speaker icon)	Sound icon
15	(video icon)	Constant video icon
16	(measure icon)	Measurement icon
17	(check-mark)	Check-mark icon
18	(angle lock icon)	Angle lock icon
19	(wifi icon)	Wireless LAN icon
20	(battery icon)	Battery indicator
21	-	Remaining space on SD card
22	(SD icon)	SD card icon

Thumbnail screen (touch panel buttons)
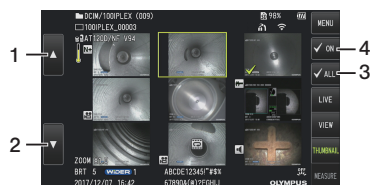
No.	Button name	Function
1	Previous page	Jumps to the previous page
2	Next page	Jumps to the next page
3	Check-mark ALL	Selects or deselects all the check-marks of the thumbnail images
4	Check-mark ON	Switches the check-mark assignment mode of the thumbnail images

View screen

● **When playing back the still image**
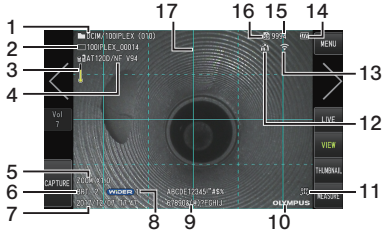
● **When playing back the still image and adjusting the volume**
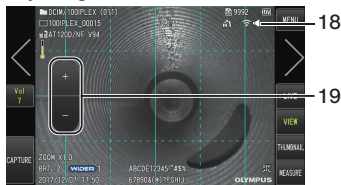
● **When playing back the movie**

No.	Icon/Indicator	Name
1	-	Folder name
2	-	File name
3	🌡️	Distal end temperature indicator

No.	Icon/Indicator	Name
4	-	Optical adapter name
5	-	Zoom level
6	-	Brightness level
7	-	Date/Time
8	WiDER Manual	Gain mode icon
9	-	Title
10	-	Logo
11	ON / ECO / OFF	LED icon
12	🔒	Angle lock icon
13	📶	Wireless LAN icon
14	🔋	Battery indicator
15	-	Number of recordable images
16	SD	SD card icon
17	-	Grid
18	🔊	Playing back sound icon
19	-	Volume level button
20	-	Movie playback time
21	-	Movie playback position bar
22	-	Index mark
23	-	Total movie duration
24	▶	Play movie icon
	⏸	Pause movie icon
	⏹	End movie playback icon

View screen (touch panel buttons)

● **When playing back the still image**
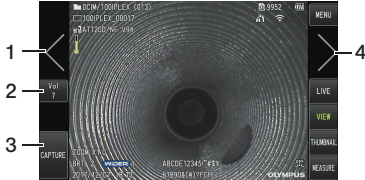
No.	Button name	Function
1	Display Previous Image (*1)	Jumps to the previous image
2	Vol	Hides or displays the volume level buttons (+, -)
3	CAPTURE	Records still image during still image playback as well as when movie playback is paused Ends sound recording after recording still image
4	Display Next Image (*1)	Jumps to the next image

● **When playing back the movie**
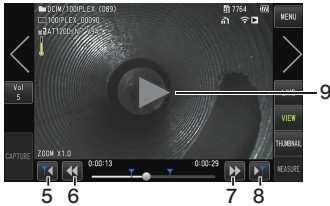
No.	Button name	Function
5	Previous Chapter Mark	Jump to previous chapter mark during movie playback
6	Fast Reverse	Fast reverse during movie playback
7	Fast Forward	Fast forward during movie playback
8	Next Chapter Mark	Jump to next chapter mark during movie playback
9	▷	Play movie (*2)
9	❚❚	Pause movie (*2)

*1   You can also display the previous and next image by swiping the screen (sliding your finger on the screen).

*2   Playback can also be paused or resumed by tapping the screen.

Constant video playback screen

● **Playing back using only the touch panel**

● **Playing back using the touch panel and [MEAS/OK] joystick***
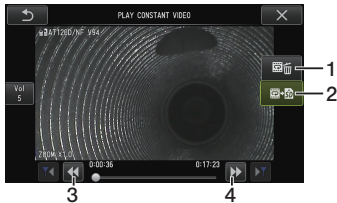
No.	Button name	Function
1	ERASE	Erases a constant video
2	COPY	Copies a constant video to an SDHC card
3	Fast Reverse	Fast reverse during movie playback
4	Fast Forward	Fast forward during movie playback

* Refer to "Playing back and pausing the movie" (page 57) on how to play back using the joystick.

TIP

・ The [MENU] button can be used to switch the constant video playback screen between a screen that is operated using only the touch panel and one that is operated with the touch panel and [MEAS/OK] joystick.

・ On the screen for playback operation using only the touch panel, the Erase button and Copy button displayed on the right are made bigger. The button operations can also be performed using the [MEAS/OK] joystick.

Note Display Screen

● Operating using the touch panel and [MEAS/OK] joystick
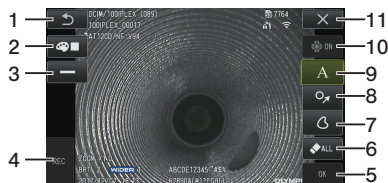
● Operating using only the touch panel

No.	Button name	Function
1	RETURN	Returns to the menu screen
2	COLOR	For selecting a line color
3	LINE	For selecting the line width
4	REC	Records images with notes

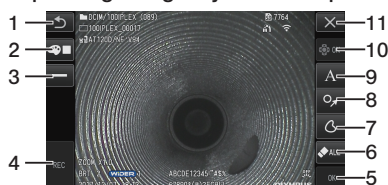| No.	Button name	Function
5	OK	Confirms the shape of the free drawing or confirms the layout of the note
6	ERASE/ ERASE ALL	Erases notes for which layout has not been finalized/ Erases all notes after confirming the layout
7	FREE DRAWING	Adjusts the layout of the figure drawn by dragging (running finger on the screen) and displays it on the screen.Free drawing is also possible by operating the touch panel.
8	MARK	Adjusts the layout of the selected mark and displays it on the screen
9	TEXT	Adjusts the layout of the text and displays it on the image
10	CURSOR/OK ON	Hides or displays the CURSOR/OK selection button
11	CLOSE	Closes the note screen and returns to the previous screen

TIP

The note display screen includes a screen that is operated using the touch panel and joysticks and another screen that is operated using only the touch panel. You can switch between the screens with the [MENU] button.

When operation using the touch panel and joysticks is selected, the buttons displayed on the two sides of the screen are made bigger.

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 "Troubleshooting" (page 99).

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 Preparing the power supply

1 Using the battery

The remaining battery level is shown by the battery indicator on the LCD monitor.

■ Loading the battery to this unit

Follow the steps below to load the battery.

① Move the release knob of the battery compartment door in the direction indicated by the arrow.
② With the release knob kept in this position, slide the battery compartment door in the direction indicated by the arrow.
③ The battery compartment door is now open.
④ Insert the battery while paying attention to the orientation of the battery. Check that the battery is locked in place and close the compartment door.
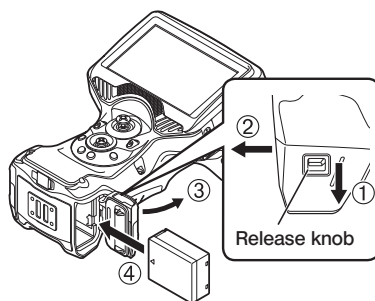
Confirm that the battery compartment door is locked.

TIP

• For information on charging the battery by using the battery charger (optional), refer to the instruction manual provided with the charger.
• 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 one hour and 30 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).
• The battery is a consumable item.

■ Removing the battery

Remove the battery by moving the tab at the battery insertion slot in the direction indicated by the arrow.

Tab
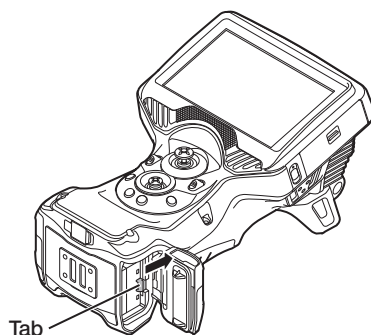
2 Using the AC adapter

Follow the steps below to connect the AC adapter.
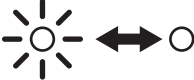
① Open the DC-IN terminal cap on the main unit.
② Connect the AC power cord to the AC inlet of the AC adapter.
③ Connect the output connector of the AC adapter to the DC-IN terminal of this instrument.
④ Then, connect the plug of the AC power cord securely to a power outlet.

DC-IN terminal cap

AC inlet
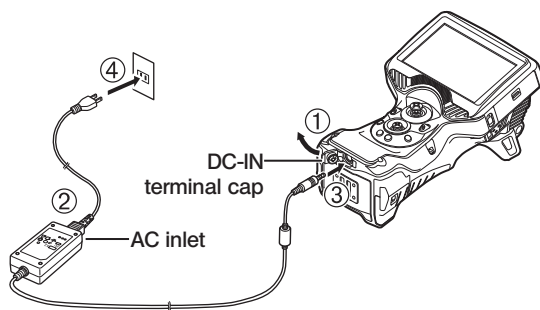
3 Charging the battery

- When the AC adapter is connected, turning off the power starts charging the battery. (Charging is not performed when the power is on.)
- The charging indicator appears blinking when charging is in progress.
- If you want to stop charging halfway, disconnect the AC adapter.
- The light of the charging indicator goes off when charging is complete.
- Disconnect the AC adapter when the battery is fully charged.

■ Charging indicator during charging

Indicator	Meaning
Blinking (Light turns on and goes off every 0.5 seconds)	Battery charging is in progress.
Alternates between blinking (2 times) and light off (approx. 1 second)	Unable to charge battery as the surrounding temperature is too low or too high. Charge the battery in an environment with a temperature between 0 to 40ºC.
Light blinks at a high speed (continuous)	Unable to charge due to communication error with the battery. → Check whether the battery terminal is dirty. → Check whether a battery other than the specified battery is used. If the problem persists, it could be due to deterioration of the battery. Replace the battery with a new one.

■ Charging with battery charger

The battery can be charged by using a battery charger (optional).

See the table below for details about the charging status.

Charging Indicator

Charging	Below 50%	Flashes in orange once every second
	50% or higher and below 80%	Flashes in orange 2 times every second
	80% or higher and below 100%	Flashes in orange 3 times every second
Fully Charged		Lights up in green
Charging Error		Flashes in green 5 times every second

3-2 Attaching and removing the optical adapter

- **Be sure to attach the O-ring to the distal end of the insertion tube before using the optical adapter.**
  Water or dirt that enters the unit from the connecting area between the insertion tube and the optical adapter may cause malfunction or damage to the unit. 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.
- **When replacing the adapter, do not hold the insertion tube at the part that is beyond the angulation section and closer to the distal end.**
  Otherwise, the angulation section 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

O-ring — Optical adapter positioning groove

Nut

Distal end — Optical adapter

Second screw thread
First screw thread

Connecting screw thread

■ 6-mm type

Optical adapter positioning groove — Second screw thread

Connecting screw thread

Nut

Distal end — Optical adapter

O-ring

First screw thread
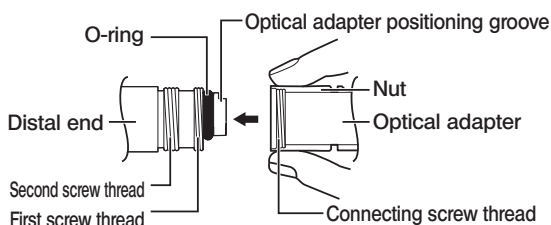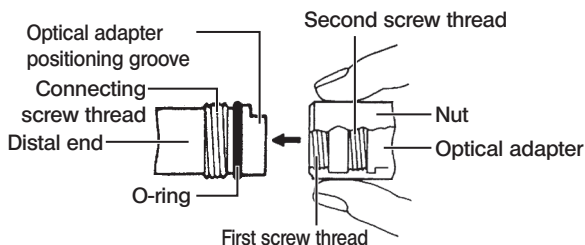
Optical adapter

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

Optical adapter (main unit)
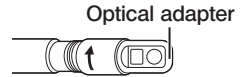
3 After passing the first screw thread, rotate the entire main body of the optical adapter clockwise while pushing gently until the optical adapter main body fits into the positioning groove of the insertion tube and stops rotating anymore.
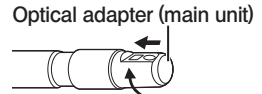
4 Rotate the nut of the optical adapter clockwise to attach the connecting screw thread to the second screw thread. Tighten the nut until it stops completely.
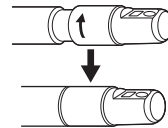
■ Removing the optical adapter

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

3-3 Inserting/removing the SDHC or micro SDHC card

■ Loading the SDHC card

Open interface door 1.
While paying attention to the orientation of the SDHC card, insert it to the end until a "click" sound is heard. Close the interface door.
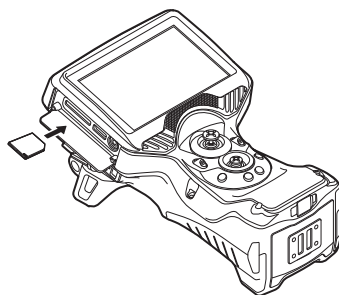
■ Removing the SDHC card

Push the SDHC card once to remove the card.

■ Attaching a microSDHC card

Open interface door 2.
While paying attention to the orientation of the microSDHC card, insert it to the end until a "click" sound is heard. Close the interface door.
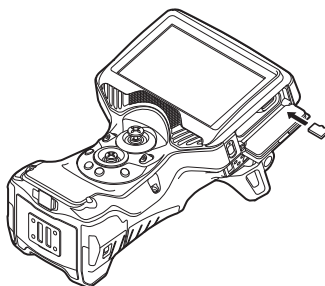
■ Removing the microSDHC card

Push the microSDHC card once to remove the card.

3-4 Attaching/removing the hand strap

The hand strap can be used to prevent dropping of the unit accidentally. Use the hand strap when you are operating the unit with one hand.

■ Attaching the hand strap to the main unit

(The figure shows the instrument held with the left hand.)

1 Pass the hand strap through the two strap holders.

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

3 Check to ensure that the hand strap is securely fastened.
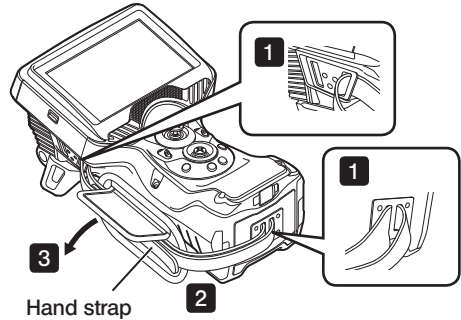
Hand strap

■ Removing the hand strap

To remove the hand strap, follow the steps to attach the hand strap in the reverse order.

3-5 Attaching/detaching the unit to/from a tripod

■ Attaching the unit to a tripod

When making observations using a tripod, mount the unit to the tripod using the tripod mounting hole on the main unit.

⚠ **CAUTION**

Make sure to mount the unit firmly to prevent it from falling off the tripod, which may cause injury or damage to the unit as a result.

■ Detaching the unit from the tripod

To remove the unit from the tripod, follow the steps for attaching in the reverse order.

3-6 Binding the insertion tube

When changing to a different location for observation, the insertion tube can be bound using the fastening strap for easy carrying.
Attach the supplied insertion tube fastening strap to this unit.
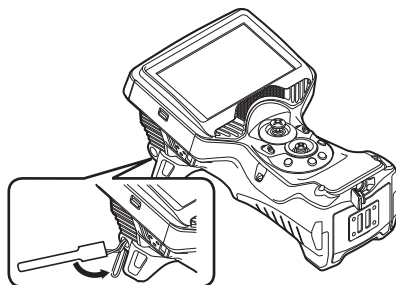
Coil the insertion tube and bundle it using the fastening strap near the bending stopper of the endoscope body.
Hold the body of the endoscope when carrying the unit.

Retention hole for distal end of insertion tube

Insertion tube fastening strap
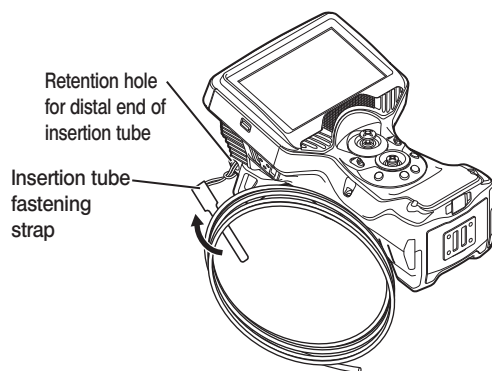
For long-distance traveling or transport, carry the unit around with it stored in the carrying case.

3-7 Attaching/removing the guide tube

■ Attaching the guide tube

For IV96100GL, it is possible to use it with guide tubes that are optional. Extend the guide tube and insert the insertion tube of this unit from the end with the mounting screw.
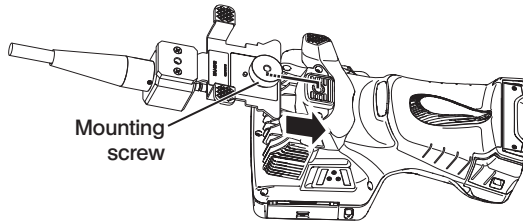
Mounting screw

Fasten the mounting screw of the guide tube firmly to the tripod mounting hole of this unit, and check to ensure that the guide tube does not rattle.

■ Removing the guide tube

To remove the guide tube, follow the steps to attach the guide tube in the reverse order.

3-8 Attaching/removing the LED guide tube

■ Attaching the LED guide tube

1 Fully straighten the tube of the LED guide tube (sold separately).

2 Turn the chuck in the anti-clockwise direction to loosen it.

3 Insert the insertion tube of the scope into the opening of the chuck.

4 Turn the chuck clockwise to fasten the insertion tube.
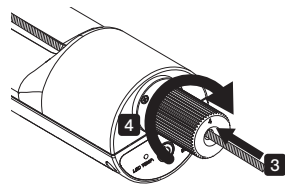
TIP

- You can adjust the position to fasten the insertion tube of the scope according to the conditions to ease observation of the inspection object.
- When you are using a ø6 mm scope, replace the chuck with one for use with the ø6 mm scope.

■ Removing the LED guide tube

Follow the steps for attaching the LED guide tube in the reverse order.

3-9 Connecting/disconnecting the USB wireless LAN adapter

■ Connecting the USB wireless LAN adapter

- Open interface door 2.
- Attach the USB wireless LAN adapter (recommended) to the USB terminal.

For more information on the recommended USB wireless LAN adapters, please contact our dealer, branch or sales office.

■ Removing the USB wireless LAN adapter

To remove the USB wireless LAN adapter, follow the steps for attaching the USB wireless LAN adapter in the reverse order.

3-10 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	☐ Are foreign objects such as dirt or sand attached to the LCD monitor, insertion tube or doors?	See "Storage and maintenance" (page 103).
	☐ Are there cracks or scratches on the LCD monitor, insertion tube or doors?	Replacement required. Contact Evident.
	☐ Any irregularities such as damage to or deformation of the exterior materials, buttons, joysticks, or levers?	
Battery	☐ Any fluid leakage, deformation, cracks or other abnormalities of the battery?	Contact Evident.
Insertion tube, angulation section, distal end	☐ Any looseness in materials other than the angulation section?	See "Storage and maintenance" (page 103).
	☐ 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.	
	☐ Any build up of dirt on the optical adapter positioning groove or screw threads of the distal end?	
	☐ 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.	
O-ring	☐ Is the O-ring missing, broken, etc.? If the O-ring is detached or broken, water may enter through the joint between the distal end and the optical adapter, and this may result in the malfunction or damage of the unit.	

Inspection location	Item	If abnormality is discovered
Optical adapter, stereo optical adapter	☐ Are there dirt or water droplets on the outer surface of the optical adapter 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 "Storage and maintenance" (page 103).
	☐ 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.	
	☐ Are the components of the optical adapter loose? Never use the unit if any looseness is found. Otherwise, the loose parts may fall off.	
	☐ Did you check measurement values before and after the stereo measurement? (Stereo measurement only)	See "Stereo measurement function (only applicable to G Lite (stereo measurement) GL ST " (page 76).
LCD monitor	☐ Any surface cracks or other abnormalities on the screen? TIP The LCD monitor is manufactured based on precision technologies. The LCD monitor may contain pixels that do not light (visible as black dots) or light permanently (visible as bright dots). This does not indicate a defect or malfunction of the product.	Replacement required. Contact Evident.
	☐ Any fingerprints or other soiling on the screen?	See "Storage and maintenance" (page 103).
Carrying case	☐ Any damage, looseness or other irregularities on the exterior, handle, or other parts of the carrying case?	Contact Evident.
	☐ 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.	

4 Basic operation

4-1 Turning ON the power

1 | Turning ON the power

When the [POWER] button (⏻) of the main unit is pressed for about 1.5 to 2 seconds, the 4 buttons light up and the power turns on.
The display screen and menu operations become enabled approx. 10 seconds after the [POWER] button (⏻) is pressed.

■ Turning OFF the power

Press the [POWER] button (⏻) of the main unit 2 seconds or longer.
When the system shuts down, the 4 buttons on the main unit turn off automatically.

2 | Selecting an optical adapter

A list of optical adapters is displayed when the power is turned on.

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

TIP

- If the optical adapter is replaced during the observation, reselect the new optical adapter from "MENU OPERATIONS".
  See "Menu operations" (page 62) and "Using the live screen/freeze screen" (page 63).
- To use a stereo optical adapter, refer to "Registering/re-registering a stereo optical adapter" (page 79). **GL ST**

4-2 Checking the remaining battery level

When power is supplied by the battery, the remaining battery level is shown by an indicator located at the top right corner of the LCD monitor. The battery status is as shown below.

Indicator	Battery condition
[battery icon]	Battery power is sufficient (100% to 50%).
[battery icon]	Battery power is low (50% to 25%).
[battery icon]	Remaining battery power is low (25% to 10%).
[battery icon] *1	Battery power is almost depleted (10% to 5%).
[battery icon] *2 Blinking	Battery power is depleted. Charge the battery or replace it with a charged battery (5% to 0%).

*1 Do not record or delete images, or format the SDHC or microSDHC card. If power runs out during these operations data could be corrupted.

*2 If the battery indicator starts to blink, quickly turn off the power or connect the AC adapter. If you continue to use the instrument without connecting the AC adapter, the power will shut down and may cause damage to the recorded data.

4-3 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 follow the steps (Menu → SYSTEM SETUP → LIGHT → OFF) to turn OFF the light when the instrument is not in use, such as when replacing the optical adapter.
- When using a UV or IR LED unit which does not illuminate visible light, refer to "Observation of special light" (page 96).

■ Turning ON/OFF the light manually

From Menu → SYSTEM SETUP → LIGHT, the light can be toggled between the "ON", "ECO" and "OFF" modes.
The status is shown by the LED icon.

TIP

Selecting "ECO" turns down the brightness and reduces battery consumption.

4-4 Operating the instrument

This unit can be operated using the buttons, levers and joysticks on the main unit as well as the touch panel on the LCD monitor.

ANGLE/LOCK joystick

FRZ/REC button

BRT lever
ZOOM lever
MENU button
LIVE button
VIEW button
CENT button

MEAS/OK joystick
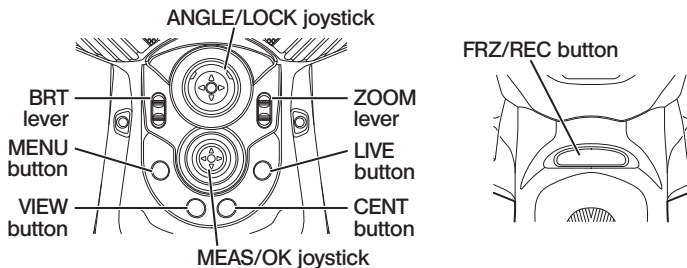
*For more information on the position of the buttons, levers and joysticks, please refer to "Nomenclature" (page 15).

See the table below for details about the different controls.

Buttons, Levers and Joysticks	Function	Touch panel
MENU button	Shows/hides the menu screen.	MENU
VIEW button (short-press)	Displays the view screen when there is a still image file in the selected folder.	VIEW
VIEW button (long-press)	Displays the thumbnail screen.	THUMBNAIL
LIVE button (except when live screen is displayed)	Displays the live screen.	LIVE
LIVE button (when live screen is displayed)	Switches the gain mode.	GAIN
CENT button	Centers the distal end of the insertion tube.	-
ZOOM lever	Uses the zoom function.	ZOOM X1.0
	Skips (backward and forward) to the index mark positions when playing back or pausing a movie in the view screen.	/
BRT lever	Changes the brightness setting.	BRT 6
	Adjusts the sound volume in the view screen.	Vol 7
ANGLE/LOCK joystick (press)	Locks or unlocks the angulation operation of the distal end of the insertion tube.	-
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.	-

Buttons, Levers and Joysticks	Function	Touch panel
MEAS/OK joystick (press button)	Sets the menu, etc. Sets the specified point when a measuring screen is displayed. Sets the layout of the note when the note screen is displayed.	OK
	Adds index mark during movie recording.	INDEX
	When a stereo optical adapter is selected, the spot ranging or stereo measurement screen is displayed. GL ST In all other cases, the scaler measurement screen is displayed.	MEASURE
MEAS/OK joystick (joystick operation)	For selecting a menu. Switches the selected image on the thumbnail screen.	Tap on the screen
	For changing to a folder to save the image on the live screen. Moves the cursor or note.	
	Displays the previous image on the view screen when the lever is tilted to the left, and displays the next image when it is tilted to the right.	/ or by swiping
	Push upward to fast forward or downward to fast reverse when playing back a movie in the view screen.	/
FRZ/REC button (short-press)	Freezes or unfreezes the observation image. Records a still image when movie recording is in progress.	FRZ / CAPTURE
FRZ/REC button (long-press)	Starts or ends movie recording on the live screen. Records a still image when a freeze screen is displayed. Ends recording during recording.	REC / STOP

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.

In the following parts of this instruction manual, the descriptions will be based on operation using the buttons, levers and joysticks.

4-5 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.
If the visibility of the inspection object deteriorates due to oil or other liquid stains, this may be resolved by following the steps described in the notes below.

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 "Error messages" (page 99).
  - 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).
- If the visibility of the inspection object deteriorates due to oil or other liquid stains when using a forward-view optical adapter (excluding stereo optical adapters and the AT100D/100S-IV76 optical adapter) or the IV9420GL-W, this may be improved by operating the endoscope such that the distal end comes into contact with the object to the left/right or in front of the live image for 5 to 10 seconds. The degree of visibility may vary depending on the type and amount of liquid stain.

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 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.

4-6 Observing the inspection object using the LED guide tube

Bending the LED guide tube

1 **Bend the tube of the LED guide tube (sold separately) according to the shape of the test object to be observed.**

When bending the tube, hold the tube so your hands are more than about 400 mm apart and then bend slowly.

NOTE

The maximum bending angle is 90 degrees.
The tube loses durability if you hold your hands too close together, bend it R150 or less, bend it further than 90 degrees, or repeatedly bend it at the same place.

---
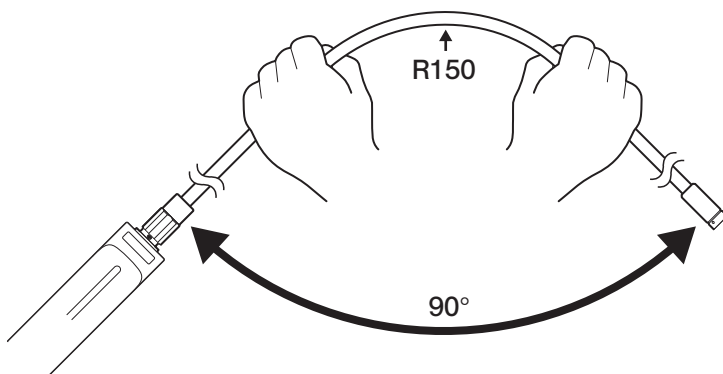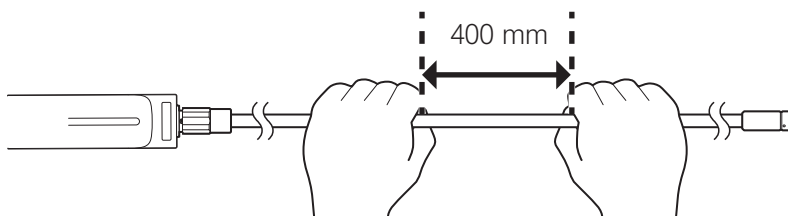
2   Turning on the LED light

Pressing the [POWER] button (⏻) each time switches the mode in the following order:

↱ Normal Light → Eco Light → OFF ↰

① To turn on the LED light, press and hold the [POWER] button (⏻) on the rear end surface of the grip for 2 seconds.

② Pressing the [POWER] button (⏻) again switches the mode to eco light.

③ Pressing the [POWER] button (⏻) again turns off the LED light.

3   Inserting the inspection object for observation

1 **Hold the grip of the LED guide tube and insert it into the inspection object.**

2 **Adjust the insertion tube of the scope according to the conditions of observation.**

With the chuck of the LED guide tube loosened, you can advance or retreat the insertion tube along the LED guide tube by using your thumb or a different finger to hold down and operate the insertion tube that is exposed from the side of the grip back and forth as illustrated below.
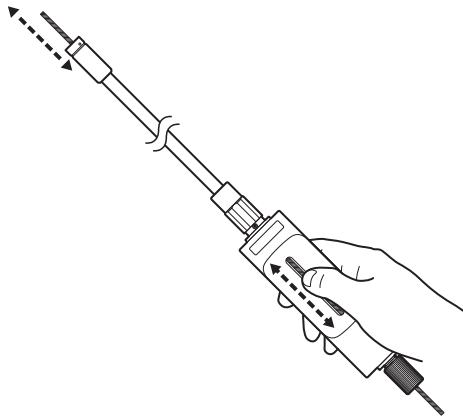
3 **To lock the insertion tube to a fixed position, fasten the chuck.**

NOTE

Do not bend when the angulation section is inserted into the LED guide tube. Otherwise, the angulation section may be damaged.

4-7 Adjusting the image display

1   Still image (Freeze)

1   **While the live image is displayed, press the [FRZ/REC] 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   **Press the [FRZ/REC] 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.
Pushing the [ZOOM] lever upward enlarges the image by up to 5 times.
To restore the image to the original size, push the [ZOOM] lever downward.

TIP

- Images are zoomed using the "digital zoom" function. Therefore, the image may become slightly coarse at higher zoom factors. The image may appear grainier when Menu → IMAGE MODE → DYNAMIC NOISE REDUCTION is set to "ON".
- The zoom function is not available during the spot ranging.

3 Adjusting the brightness

■ Brightness adjustment using the [BRT] lever

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

Pushing the [BRT] lever upward brightens the overall image and pushing it downward darkens the image.

Brightness can be adjusted to one of the 16 different levels.

■ Switching the Gain Mode

Pressing the [LIVE] button while a live image is displayed switches the gain mode.

Mode	Description
Auto (No Display)	This mode automatically adjusts the brightness according to the settings of "BRT". However, noise may increase depending on the "BRT" settings.
WiDER1	This mode is used for displaying live images at a level brighter than "Auto (No Display)". However, the noise may increase under certain observation conditions.
WiDER2	This mode is used for displaying live images at a level brighter than "WiDER1". However, the noise may increase under certain observation conditions.
Manual	This mode is for observation at a fixed brightness level according to the "BRT" settings. Use this to observe moving subjects. Noise may also be noticeable in this mode compared to the other modes.

4-8 Switching the folder on the live screen

On the live screen, you can use the [MEAS/OK] joystick to switch the folder for recording and playing back the image.

1 **Operate the [MEAS/OK] joystick while a live image is displayed.**

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 that can be switched using the [MEAS/OK] joystick is up to the second layer.

4-9 Recording images

The images being observed can be recorded to an image recording media (SDHC card) as still images or movies. Use the provided SDHC card or the recommended SDHC card. For recommended products, please contact Evident.
SD and SDXC cards are not supported.
Make sure that the image recording media is correctly loaded before use.

TIP

Use microSDHC cards for constant videos.
For more details, refer to "Using the constant video" (page 58).

1   Image recording preparation

Format the image recording media with this instrument before using it. For details about formatting, refer to "SD FORMAT" (page 64).
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		400KB	10500 images
Movie (per sec.)	30f	650KB	100 minutes
	60f	1,300KB	50 minutes
Audio (per sec.)		35KB	-

Settings for image recording must be configured using the "MENU OPERATIONS". See "Menu operations" (page 62) and "Using the live screen/freeze screen" (page 63).

■ 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, specify the setting in MENU → SYSTEM SETUP → DISPLAY.

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 the "FILE NAME MARK" menu to "ON" enables the 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 appending of file marks, specify the setting in MENU → RECORD MODE → FILE NAME MARK.

■ 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 ".MP4" for movie files.

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

TIP

- If the "FILE NAME MARK" menu is set to "ON", 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.**

Operate the [MEAS/OK] joystick to select the destination folder for saving (refer to "Switching the folder on the live screen" (page 47)).

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

The image is frozen.

3   **While the frozen image is displayed, long-press the [FRZ/REC] button.**

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.
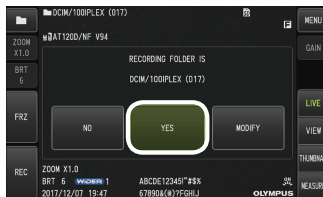
5 Select the mark to add to the end of the file name of the image you are recording.
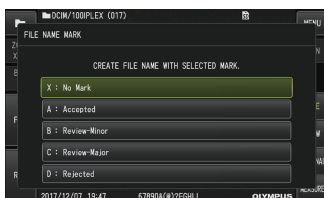
6 Select the strings in the preset title list registered in advance.
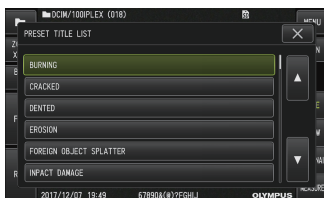
TIP

For procedures to register the preset title in advance, see "Registering a text string as a preset title" (page 69).

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

8 Audio recording starts after recording of the still image is complete.

The sound recording in progress icon (🎤) blinks on the LCD monitor while the sound recording is in progress. Only the still image is recorded and the sound is not recorded when MENU → RECORD MODE → STILL AUDIO is set to "OFF".

9 Long-press the [FRZ/REC] button to exit the sound recording.

TIP

- If the "FILE NAME MARK" menu is set to "OFF", Steps 4 to 6 will be skipped.
- If the "STILL AUDIO" menu is set to "OFF", Steps 8 to 9 will be skipped.
- Audio recording up to 1 minute is possible when a headset (commercially available) is connected with the STILL AUDIO menu set to "ON".
- The sound recording stops automatically whenever the image recording media becomes full.
- Still images can be recorded to the internal memory.
  - However, images can only be recorded to the internal memory when a media for recording images is not inserted.
  - The internal memory can store up to about 20 still images.
  - Sound recording cannot be stored in the internal memory.
  - When a media for recording images is inserted, a DCIM/INTERNAL folder is automatically created and all images are copied to that folder. After copying is complete, images in the internal memory will be deleted.
- The recorded still images can be measured in some cases. For details, refer to "Measurement" (page 90).

3   Recording the movie

1 **Select the folder of the save destination.**

Operate the [MEAS/OK] joystick to select the destination folder for saving (refer to "Switching the folder on the live screen" (page 47)).

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

**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].
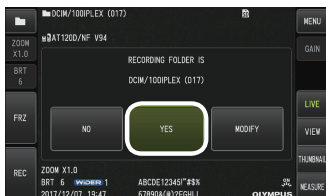
4 Select the mark to add to the end of the file name of the image you are recording.
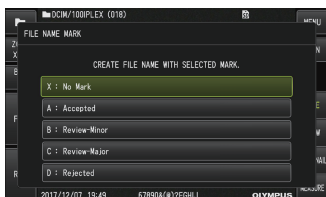
5 Select the strings in the preset title list registered in advance.
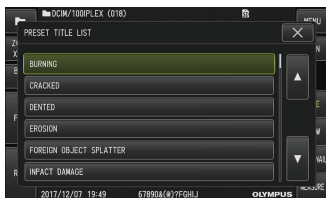
6 After a still image is recorded, the movie recording confirmation dialog appears.

7 Select [YES].

The recording of the movie and the sound starts.

The movie recording in progress 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 recorded and added to the movie that was previously recorded. For details, refer to "Appending the movie" (page 54).

Short-pressing the [FRZ/REC] button during movie recording allows you to record still images.

Pressing the [MEAS/OK] joystick during movie recording allows you to append an index mark.

By adding index marks, you can skip backward and forward to the marked positions when playing back or pausing the movie.

8 Long-press the [FRZ/REC] button to exit the movie recording.

The blinking movie recording in progress icon (⬤) disappears when the movie recording is complete.

TIP

- If the "FILE NAME MARK" menu is set to "OFF", Steps 3 to 5 will be skipped.
- Audio recording is possible when a headset (commercially available) is connected with the STILL AUDIO menu set to "ON".
- The movie recording stops automatically whenever the SDHC card becomes full or when the file size reaches 4 GB.

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 is pressed, or the folder is changed between the image recording folder and the playback folder, "CONTINUE" cannot be selected.

4-10 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.

Live screen or
freeze screen

[VIEW] button
(long-press)

[VIEW] button
(short-press)

[LIVE] button or
[VIEW] button
(long-press)

[LIVE] button or
[VIEW] button
(short-press)

[VIEW] button (long-press)

[MEAS/OK] joystick (short-press) or
[VIEW] button (short-press)

Thumbnail screen
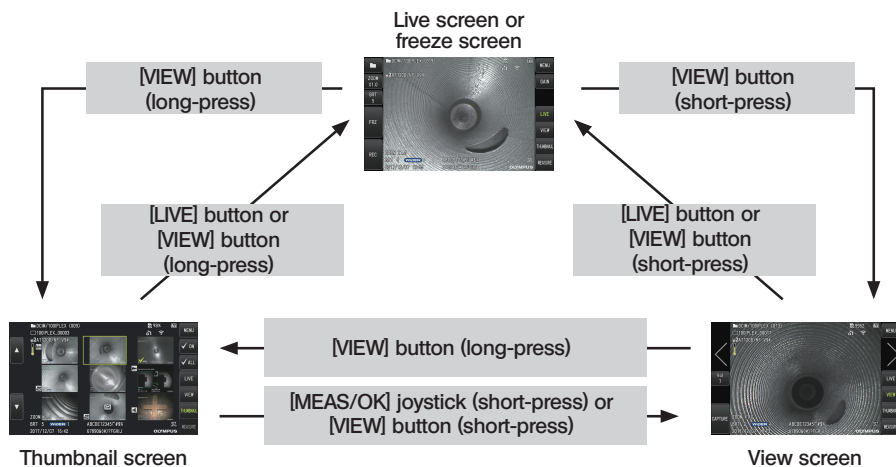
View screen

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

1 Select the folder of the save destination.

See "Switching the folder on the live screen" (page 47) for details about operations.

2 Press 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.

Operate the [MEAS/OK] joystick to switch the image to play back.
- Push the [MEAS/OK] joystick to the left.
  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.
- Push the [MEAS/OK] joystick to the right.
  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 Press the [LIVE] button or the [VIEW] button to return to the live screen.

TIP

The still image recorded in the binocular view can be measured using stereo measurement
after the image is recorded. For measurement, see "Stereo measurement function (only
applicable to G Lite (stereo measurement)) GL ST " (page 76). GL ST

2 Viewing the thumbnail screen and selecting image

The thumbnail screen shows multiple recorded movies and still images on a single screen (up
to 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 "Switching the folder on the live screen" (page 47) for details about operations.

2 Long-press the [VIEW] 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 (N+) appears for the image containing the note information (TEXT/MARK/
FREE DRAWING).
The measurement icon (📏) appears for the measured image.

■ To select a thumbnail image

The frame can be moved by operating the [MEAS/OK] joystick.
The image framed is the image being selected.

■ To play back an image

Select the image to play back, and press the [MEAS/OK] joystick.
The selected image is played back in a full-screen view.

■ To select or cancel selecting an image

Selecting a thumbnail directly using the [MEAS/OK] joystick will display the View screen.
It is therefore necessary to select the check-mark ON button beforehand.
Pressing the [MEAS/OK] joystick with a thumbnail image selected (highlighted by a frame) under this condition displays a check mark (✓) at the lower left corner of the thumbnail image.
Alternatively, you can select an image using the [MEAS/OK] joystick and push the [BRT] lever upward. Doing so displays a check mark (✓) at the lower left corner of the thumbnail image.
Doing the same while a check mark (✓) is displayed in the lower left corner of the thumbnail image will cancel the mark (✓).

■ To select or cancel selecting all thumbnail images

Pushing the [BRT] lever downward displays a check mark (✓) at the lower left corner of all thumbnail images.
To cancel the check mark (✓) for all the thumbnail images, push the [BRT] lever downward again.

■ To move or delete the selected image

A check mark (✓) is displayed in the lower 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 **Long-press the [LIVE] button or the [VIEW] 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

- Pressing the [MEAS/OK] joystick during playback pauses the movie.
- Pushing the [MEAS/OK] joystick upward (or downward) fast forwards (fast reverses) the movie that is playing. The fast forward (fast reverse) speed can be adjusted to one of the four levels.
- Pushing the [ZOOM] lever upwards and downwards skips forward and backward respectively to the marked positions in a movie recorded with index marks.
- Pressing the [MEAS/OK] joystick while pausing will resume playing back the movie.
- Long-pressing the [FRZ/REC] button while playback is paused will record the image being paused as a still image.

4-11 Using the constant video

Constant video is a feature that automatically records movies up to about 30 minutes while the live screen is displayed.

Constant videos can be recorded to a recordable media intended for such a purpose (microSDHC card). Use the recommended microSDHC card. For recommended products, please contact Evident.

microSD and microSDXC cards are not supported.

Make sure that the media for recording constant videos is correctly inserted before use.

Make use of this feature while paying attention to the following points.

- Due to the recording function of the unit, movies that were recorded more than about 30 minutes ago will be erased.
- Only movies in the live image display can be recorded.
- Constant video will not be recorded for about 5 seconds when live images are displayed for 12 hours continuously while constant video is running.
- Index marks cannot be recorded on constant video.

1 Image recording preparation

Format the constant video recording media with this unit before using it. For details about formatting, refer to "microSD FORMAT" (page 64).

- Mount a microSDHC card.
- Set MENU → RECORD MODE → CONSTANT VIDEO to "ON".
  A constant video recording icon is displayed.
- To record sound during constant video recording, set MENU → RECORD MODE → STILL AUDIO to "ON" and use a headset.

2 Recording a constant video

Constant videos are recorded after constant video recording is enabled in the menu.

TIP

Never attempt to remove the microSDHC card while the data recording is in progress. Otherwise, the recording stops and an error message appears on the display.

3 Playing a constant video

- Recorded movies can be played back from Menu → PLAY CONSTANT VIDEO.

For more details on how to play back constant video, refer to "Playing back and pausing the movie" (page 57).

- Pressing the Copy button on the constant video playback screen copies the constant video to the SDHC card.
- Movies are stored in the DCIM/CONSTANTVIDEO folder and displayed on the view screen and thumbnail screen.
- The estimated time required to copy the longest constant video (approx. 30 minutes) is as follows.
  - microSDHC card (Class 10) → SDHC card (Class 10): approx. 7 minutes

4-12 Displaying live images on the external monitor

Live images can be displayed on the external monitor (commercially available) by connecting the HDMI cable (supplied) to the HDMI mini terminal inside interface door 1.

HDMI cable
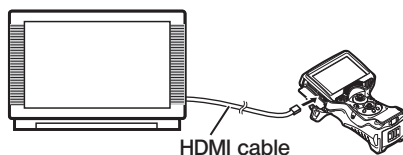
4-13 Displaying live images on the mobile terminal

The live image is displayed on the IPLEX Image Share screen when connection is established with a mobile terminal (commercially available) installed with IPLEX Image Share via wireless LAN. To use IPLEX Image Share, install the app from Apple's App Store.
For details, refer to the Evident website.

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

- IPLEX Image Share comes with the following features.
  - Display of live images
  - Still image recording or movie recording of live images on the mobile terminal
  - Thumbnail display of recorded images and display of recorded images on the mobile terminal
  - Confirmation and change of connection settings

Make sure to perform the following step before discarding this product or transferring its ownership to another party.

Select Menu → Wireless Settings → Initial Settings and choose "Execute".

The following information will be initialized when you perform this action.

- Access point information (SSID, PW, encryption scheme)
- Other network settings (connection channel, picture quality)

TIP

- Up to 2 mobile terminals (commercially available) can be connected at the same time.
- When the remaining battery level of the mobile terminal (commercially available) is running low, the image display or movie recording operation may stop, or still image recording and movie recording may be disabled.
- Live images cannot be displayed on the mobile terminal while recording movies to a SDHC card.

1   Connecting the USB wireless LAN adapter

See "Connecting/disconnecting the USB wireless LAN adapter" (page 33).

2   Enabling the USB wireless LAN adapter from the menu

1   Set MENU → WIRELESS MODE → CONNECT to "ON".

2   Press OK when the SSID is displayed.

- A wireless LAN icon appears on the LCD monitor screen and communication by this unit starts.

3   After completing the above setting, set the displayed SSID on the mobile terminal.

4-14 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 the PC from the SDHC card containing those images.
To use InHelp VIEWER software, download it from the Evident website (https://www.olympus-ims.com/en/service-and-support/downloads/).

TIP

Data on microSDHC cards cannot be read directly by a PC. (See "Using the constant video" (page 58).)

4-15 Transferring recorded images to a PC

You can connect via wireless LAN to a computer or tablet (commercially available) on which ViSOL Desktop (software) is installed, and transfer still images and video files recorded with this product to ViSOL Desktop.
Download the software from ViSOL when using ViSOL Desktop.
For details, refer to the Evident website.
https://app.olympus-ims.com/marketplace/store

When connecting from ViSOL Desktop to this product via wireless LAN, the name of the connection source (PC or tablet) will be displayed. Check that the name is correct before allowing the connection.

Be sure to refer to "Displaying live images on the mobile terminal" (page 59) for steps to erase the recorded information before discarding this product or transferring its ownership to another party.

(TIP)

- Only one PC or tablet (commercially available) can be connected at the same time.
- The following operations cannot be performed with this product while connected to ViSOL Desktop via wireless LAN.
  - Recording still images and movies
  - Displaying the view screen and thumbnail screen
  - Formating SDHC card
  - Copying constant video to SDHC card

5 Menu operations and functions

5-1 Menu operations

This unit can be operated using either the buttons and joysticks on the main unit or the touch panel.

■ Operation using the buttons and joysticks on the main unit

1 Press the [MENU] button.

The menu screen is displayed.
*For the IV9420GL-W, the "optical adapter selection" icon will not appear.
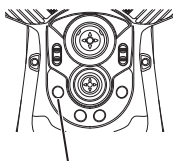
[MENU] button

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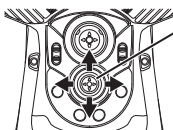
[MEAS/OK] joystick

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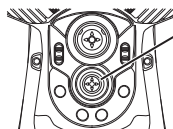
[MEAS/OK] joystick

■ Using the touch panel

1 Press the [MENU] button on the LCD monitor.

The menu screen is displayed.

2 Press the button of the menu to run.

Pressing the [RETURN] button (⤺) during menu operations will return to the screen one screen before.

Pressing the [CLOSE] button (✕) during menu operations will return to the screen before displaying the menu.
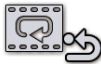
5-2 Using the live screen/freeze screen

Initial setting menu

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

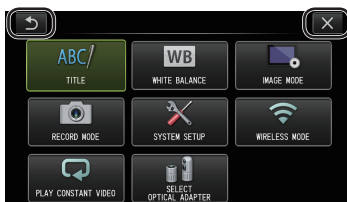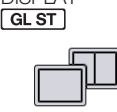| Main menu	Sub menu	Item
TITLE ABC/	-	**Inputs a title.** Puts a title on the live screen and recorded images. Up to 30 characters can be inputted. See "Inputting a title" (page 67).
WHITE BALANCE WB	-	**Adjusts the white balance (Live screen only).** Specifies whether to adjust the white balance or not. 　• 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	IMAGE INVERSION ЯR	**Flips the image.** LCD and HDMI output images can be flipped. The options available are OFF, HORIZONTALLY REVERSE, VERTICALLY REVERSE and ROTATE. This option cannot be used for the freeze screen.
	DYNAMIC NOISE REDUCTION NR	**For specifying settings on Dynamic Noise Reduction.** You can specify whether to enable or disable Dynamic Noise Reduction. 　• OFF : Disable 　• ON　: Enable This option cannot be used for the freeze screen.
	STEREO IMAGE DISPLAY GL ST	**Selects the screen in monocular view or binocular view.** Sets the live image whether to display in monocular view or binocular view when the stereo optical adapter is attached. 　• MONOCULAR IMAGE : Displays the image in monocular view (one screen) 　• BINOCULAR IMAGE　: Displays the image in binocular view (two screens) This option cannot be used for the freeze screen.
	IMAGE DISPLAY MODE	**For selecting a forward view or side view display.** For specifying the display mode when the AT100D/100S-IV76 optical adapter is used. 　• DUAL VIEW　　　: Displays both forward and side views. 　• FORWARD VIEW : Displays only the forward view. 　• SIDE VIEW　　　: Displays only the side view. This option cannot be used for the freeze screen.

Main menu	Sub menu	Item
IMAGE MODE	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.
RECORD MODE	FILE NAME MARK	**Automatically adds a file mark to the end of the file name of the recorded image.** · 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".
	SD FORMAT	**Formats (initializes) the SDHC card.** · CANCEL : Does not perform formatting. · EXECUTE : Executes formatting. ⚠ **CAUTION** **Never remove the SDHC card while formatting is in progress.** TIP Formatting an SD card deletes all of its data.
	microSD FORMAT	**Formats (initializes) the microSDHC card.** · CANCEL : Does not perform formatting. · EXECUTE : Executes formatting. ⚠ **CAUTION** **Never remove the microSDHC card while formatting is in progress.** TIP All data will be erased after formatting is complete.
	MOVIE FRAME RATE	**For selecting the frame rate for movie recording.** · 30 Frames/Sec · 60 Frames/Sec

Main menu	Sub menu	Item
RECORD MODE	STILL AUDIO	**For specifying settings on sound recording.** You can specify whether to perform sound recording during still image or movie recording. A headset is required for sound recording. ・ OFF : Disable ・ ON : Enable **⚠ CAUTION** Even when STILL AUDIO is enabled, sound will not be recorded if a headset is not connected.
	CONSTANT VIDEO	**For specifying setting on constant video recording.** You can specify whether to perform constant video recording while the live screen is displayed. ・ OFF : Disable ・ ON : Enable
	REC FUNCTION	**For specifying the type of image to record using the [FRZ/REC] button.** You can specify the type of image to record when using the [FRZ/REC] button to perform recording. The unit functions as follows when you press and hold down the [FRZ/REC] button. ・ STILL+MOVIE : Live mode: Records both still images and movies Freeze mode: Records only still images ・ STILL ONLY : Live mode: Records only still images Freeze mode: Records only still images
SYSTEM SETUP	DISPLAY	**For selecting the information to display on the screen.** You can select whether to display the zoom, brightness, date/time, title, logo and optical adapter options.
	DATE TIME	**Specifies date and 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". See "LANGUAGE" (page 70).

Main menu	Sub menu	Item
SYSTEM SETUP	VERSION Ver.	**Displays the version information.** Displays the software program version of the main unit, initial data version and the grade information of the main unit.
	START UP	**Saves the settings that are currently being applied.** · OFF : Restores the initial settings at the next startup · ON : Applies the settings at the power off state at the next startup This can be used to set the brightness level, zoom ratio, gain mode and light.
	BUTTON LIGHT	**For setting the button light.** For specifying whether to light up the button during operation. · OFF : Light off · ON : Light on
	LIGHT	**Turn on the light of the insertion tube.** You can specify a setting for the light. The options available are OFF, ECO and ON.
WIRELESS MODE	CONNECT	**For setting wireless communication.** · OFF : Disable · ON : Enable
	DEFAULT	**Initializes the wireless settings.** · CANCEL : Does not execute formatting. · EXECUTE : Executes formatting.
PLAY CONSTANT VIDEO	-	**Plays back the constant video.** Playback starts automatically if there are recorded constant videos.
SELECT OPTICAL ADAPTER	-	**Displays the optical adapter list.** Select an optical adapter from the list that is to be connected to the system. This option cannot be used for the freeze screen.

Inputting a title

There are two methods shown below that can be used to input a title.
- Input using the software keyboard
- Input by selecting a preset title

■ Input using the software keyboard

1 Select the input mode.

Select "⁄∗@" or "ÀÁÂ".

2 Select the text buttons you want.

● **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.

■ Select a preset title for input

With this procedure, you can select a preset character string and use it to input a title.
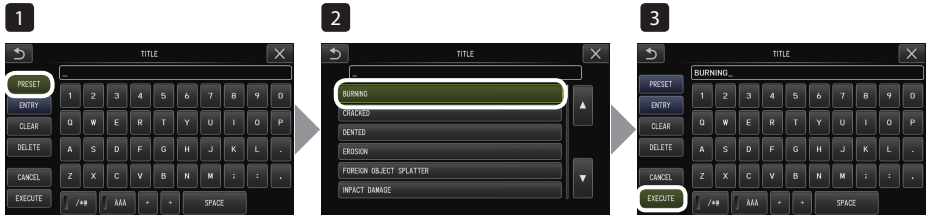
1 Select [PRESET].

A list of preset titles is displayed. To cancel the preset title selection, press the [x] button 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 push the [MEAS/OK] joystick upward or downward, or press the up button or the down button on the right side of the screen.

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 "Inputting a title" (page 67).

2 **Select [ENTRY].**

A list of preset titles is displayed.
To cancel the preset title registration, press the [x] button 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 push the [MEAS/OK] joystick upward or downward, or press the up button or the down button on the right side of the screen.

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 DATE TIME

Use the procedure below to specify date and time.
SYSTEM SETUP › DATE TIME › D.M.Y H:M, DATE FORMAT SETUP
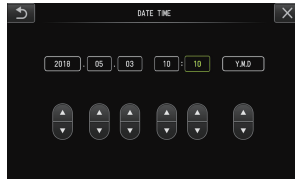
Be sure to set the correct date and time before using the instrument for the first time.
The date and time information is recorded together with the screen information to the still image and movie.

5 LANGUAGE

Use the procedure below to select the language for menus and error messages that appear on the display.
SYSTEM SETUP › LANGUAGE › Select a language.

TIP

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

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.** · CANCEL : Do not delete image. · EXECUTE : Delete image. Deletes the images selected on the thumbnail screen or images with the mark (✓).
MOVE FILE	**Moves image files from one folder to another.** Recorded images can be moved to a different folder. The currently selected image or all images that are marked (✓) on the thumbnail screen are moved.
RENAME FILE	**Changes the image file name.** You can change the name of a recorded image file (within 30 letters).
CHANGE FOLDER	**Switches the folder for image recording or playback.** You can switch a folder for image recording and playback. The initial setting is set to "DCIMO100IPLEX". You can switch to the folder displayed on the menu screen. For operations to switch to the folder which is not displayed on the menu screen, see "Switching the folder on the live screen" (page 47).
MAKE FOLDER	**Creates a new folder for image recording and playback.** You can create a folder for image recording and playback. Up to 1,000 folders can be created in each folder.
RENAME FOLDER	**Renames a folder for image recording and playback.** You can rename a folder for image recording and playback.

TIP

You can use only alphanumeric characters and symbols for folder and file names. The Japanese characters cannot be used. And some symbols cannot be used for the folder and file names.

The following settings can be applied from the view screen menu.

Menu	Available settings
DELETE	**Deletes the recorded image.** · CANCEL : Do not delete image. · EXECUTE : Delete image. Deletes the image displayed on the view screen.
NOTE *ABC*	**Inputs the note information (TEXT/MARK/FREE DRAWING) to the desired position on the screen (view screen for still image only).** You can input note information (TEXT/MARK/FREE DRAWING) on the still image that is being played back.

6 Measurement functions

6-1 Scaler measurement function

1 About scaler measurement

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 to be measured are on the same vertical plane as the optical axis.

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2 Scaler measurement screen

■ Explanation of the scaler measurement screen

Message box
Displays information related to operation.

Reference length
For entering the dimensions of the parts where the length measurement is known.

CURSOR/OK button
Operate the cursor and enter the reference length on the screen.

Point
Reference point or measuring point that has been entered.

Cursor
For specifying the reference point or measuring point.

Measured value
Displays the measurement for the entered points.

TIP

Tapping the [CURSOR/OK ON] button (🔘 ON) each time switches the [CURSOR/OK] button repeatedly in the order of displayed, move, hidden.

List of messages displayed in the message box

PUT REFERENCE POINT1.
PUT REFERENCE POINT2.
INPUT REFERENCE LENGTH.
PUT MEASURING POINT1.
PUT MEASURING POINT2.

■ Scaler Measurement Menu and Features

Menu	Description
CLEAR	Clears the measurement point or reference point that is last specified.
REFERENCE	For setting a new reference length.
MEASURE	Displays the scaler measurement screen.
UNIT	For selecting the unit for the measurements. Selects "mm" or "inch".
CURSOR	For selecting a cursor shape. Selects "✕" or "◥".
EXIT MEASUREMENT	Exits scaler measurement.

■ Attaching the optical adapter

1 Follow "Attaching and removing the optical adapter" (page 27) to mount an optical adapter that can be used for scaler measurement.

2 Select an optical adapter from the menu.
See "Selecting an optical adapter" (page 36).

TIP

Check "Optical adapter specifications" (page 112) for an optical adapter that can be used.

■ Steps for making scaler measurements

1 Start up

Press the [MEAS/OK] joystick while the image to be measured is displayed.

2 Specify the reference points

Align the cursors respectively with the two ends of an object in the image for which the length is known, followed by pressing the [MEAS/OK] joystick.

3 Set the reference length

Enter the known length (reference length) accordingly by pushing the [MEAS/OK] joystick up/down or to the left/right. Press the [MEAS/OK] joystick to confirm the input.

4 Specify the measuring points

Align the cursor with both ends of the object to measure and press the [MEAS/OK] joystick.
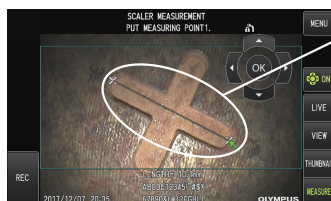
Specify the
measuring points

6-2 Stereo measurement function (only applicable to G Lite (stereo measurement)) GL ST

To perform stereo measurement, it is necessary to use a stereo optical adapter (optional) and expand the functionality to support IPLEX G Lite (stereo measurement function, optionaly). 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 method of measurement is used to find out the corresponding points on 2 images (same position on both the image on the left and the one on the right) that are obtained using two objective lenses which are set in parallax. Proper measurements cannot be obtained if the corresponding points are incorrect, so please make sure to understand the content of the respective chapters thoroughly before using the stereo measurement function.
This stereo measurement function allows you to select the display mode of the live image from either the monocular view or the binocular view.
The monocular view is a display mode to observe the approach to the measurement area easily on the screen.

Measurement function can be performed not only using the white light type but also the optional LED unit (UV light type or IR light type).

Steps for stereo measurement

The following shows measurement procedures and the screen flow.

Attaching the stereo optical adapter (See page 78)

Registering/re-registering a stereo optical adapter (See page 79)

Selecting a registered stereo optical adapter (See page 84)

Checking measurement values (before measurement) (See page 84)[*1]

Capturing the measurement area (See page 87)

Live screen
Observing the measurement area
For procedures to select the monocular view or the binocular view of the live screen. (See "Using the live screen/freeze screen" 63 page)

Monocular view   Binocular view

[MEAS/OK] or ZOOM[W]

Spot ranging screen
Check the distance from the target position before taking measurements.

[LIVE]   [LIVE]

[MEAS/OK]

Measurement (See page 90)

Measurement screen
Measure the length or the area.

[MEAS/OK]

MENU/ Exit   MENU/ Exit
[LIVE]   [LIVE]

Checking measurement values (after measurement) (See page 84)[*1]

*1 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.

2 ## Attaching the stereo optical adapter

See also "Pre-operation/post-operation inspections" (page 34) for more information on attaching stereo optical adapters.

1 **Make sure that the O-ring in the distal end is properly attached.**

See "Attaching and removing the optical adapter" (page 27) 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.**
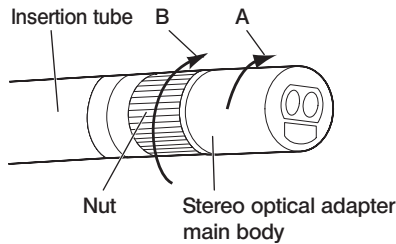
NOTE

- 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.
- 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.

Before performing stereo measurement using a stereo optical adapter, register the stereo optical adapter to this unit.
Similarly, if the stereo optical adapter and insertion tube combination has changed due to reasons such as purchase of a new optical adapter or repair of the insertion tube, register the stereo optical adapter again.
Also, if the measured value is found to be incorrect upon checking the result, go through the steps of a new registration again to re-register the stereo optical adapter.

This registration process is to create information on the combination of the stereo optical adapter and insertion tube that you are using.
Information that is created will be stored in the built-in memory of this unit.

■ Registering a new stereo optical adapter

1 Attach the stereo optical adapter to the distal end of the insertion tube.

See "Attaching the stereo optical adapter" (page 78) for details about operations.

2 In "Menu Operations", select "SELECT OPTICAL ADAPTER" followed by "NEW STEREO ADAPTER" and press the [MEAS/OK] joystick.
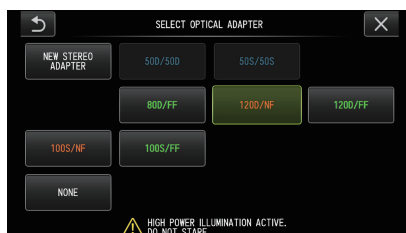
3 Select whether to use a forward view or a side view type.
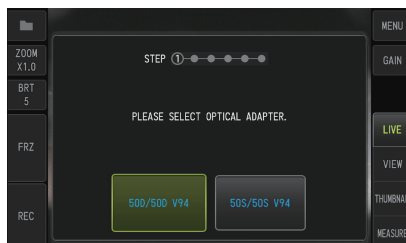
4 Insert the optical data media into the SDHC card slot, select "YES" and press the [MEAS/OK] joystick.

If an SDHC card for recording images is inside the slot, remove the SDHC card and insert the optical data media.
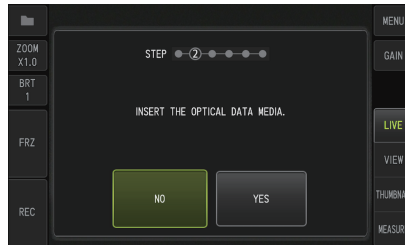
5 After ensuring that the adapter name and set number of the stereo optical adapter are correct, select "YES" and press the [MEAS/OK] joystick.
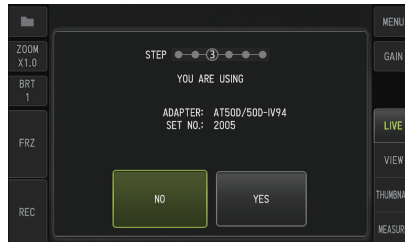
TIP

If an adapter has already been registered, you will see a screen asking whether you want to overwrite the old information.

---

6 After ensuring that the stereo optical adapter is properly mounted, select "OK" and press the [MEAS/OK] joystick.

See "Attaching the stereo optical adapter" (page 78) for details about operations.

7 Adjust the brightness of the white image.

Use the check tool that comes supplied with the stereo optical adapter.
Insert the distal end of the insertion tube all the way into the far end of the forward view or side view guide hole, turn the check tool to adjust the orientation such that the protrusion at the center of the white recessed part moves close to the center of the field of view, followed by operating the [BRT] lever to adjust the brightness.

Forward-view optical adapter

Side-view optical adapter
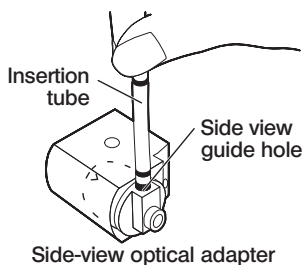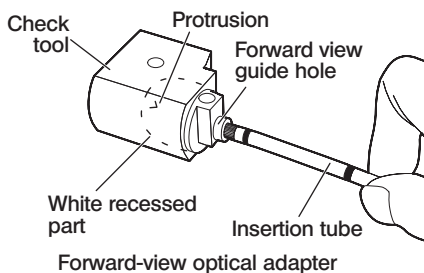
TIP

How to capture a white image

As the way the white image is captured may affect the accuracy of the measurement, make sure to capture a white image upon obtaining the appropriate brightness according to the illustration below.

Insufficient brightness

Protrusion

Optimal brightness

Brightness level at which protrusion is no longer visible

Excessive brightness

Too bright
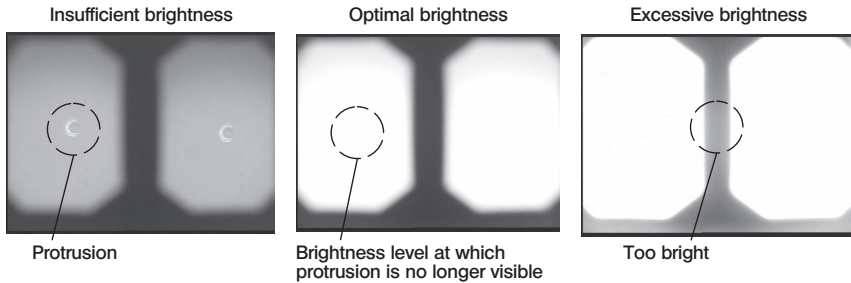
An optimal white image cannot be captured if dirt is attached to the white recessed part of the check tool. If dirt is found, detach the part (guide) with the forward view or side view guide hole from the white recessed part and remove the dirt.
To remove the guide, turn it in the anti-clockwise direction. Wipe off the dirt with gauze that is moistened with cleaning water. To mount the guide back on, follow the steps for removal in the reverse order.

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

Hold the insertion tube at a point behind the angulation section to prevent applying any force on the optical adapter and angulation section.
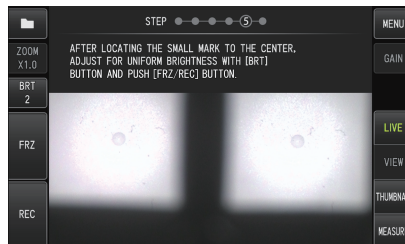
NOTE

When capturing a white image, the measuring accuracy may be affected if force is applied on the optical adapter.

9 After the message below appears, remove the optical data media from the SDHC card slot, select "OK" and press the [MEAS/OK] joystick.
"REMOVE THE OPTICAL DATA MEDIA."
Place the optical data media (SDHC card) in the optical adapter case to prevent it from being misplaced.
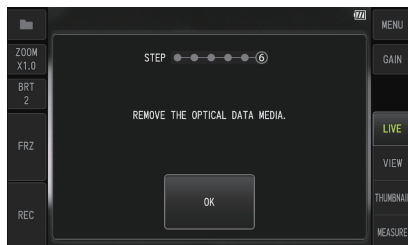
10 Check the measurement values.

After registering the stereo optical adapter, it is necessary to check the measurement values. See "Checking measurement values" (page 84) for details about operations.

TIP

After registration of the stereo optical adapter is complete, a file named "IV7CALIB/ FREEZE.JPG" is created in the optical data media. Deleting this file will not affect operation of this unit.

■ Re-registering a stereo optical adapter

Re-register a stereo optical adapter following the same steps as "Registering a new stereo optical adapter" (page 79).

4 Selecting a registered stereo optical adapter

If a stereo optical adapter has already been registered, select it from the Optical Adapter Selection screen.

1 **Attach the stereo optical adapter to the distal end of the insertion tube, followed by selecting "SELECT OPTICAL ADAPTER" from "Menu Operations".**

A list of optical adapters is displayed.

2 **Select a registered stereo optical adapter and press the [MEAS/OK] joystick.**

You will see a message prompting you to check the adapter name and set number.

3 **After ensuring that the set number coincides with that of the stereo optical adapter, select "OK" and press the [MEAS/OK] joystick.**

The live image is displayed in a monocular or binocular view.

4 **Checking measurement values**

After selecting the stereo optical adapter, it is necessary to check the measurement values. See "Checking measurement values" (page 84) for details about operations.

5 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.**

Side-view optical adapter hole

Forward-view optical adapter hole
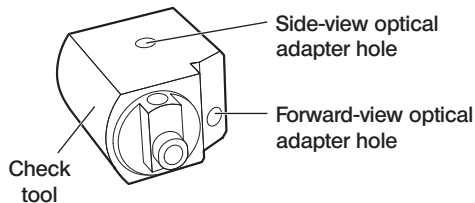
Check tool

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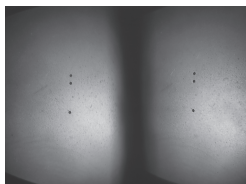
Forward-view optical adapter
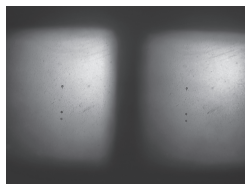
Side-view optical adapter

3 Press the [MEAS/OK] joystick or push the [ZOOM] lever downward while the live screen is displayed.

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 [Object distance] and press the [MEAS/OK] joystick.

The measurement method selection screen is displayed.

5 Select [DISTANCE] and press the [MEAS/OK] joystick.

The measurement screen is displayed.

6 Operate the [MEAS/OK] joystick to specify the measuring points (2 points)

7 Long-press the [FRZ/REC] button.

The measured image is recorded.

8 Confirm that the error range of measurement values before and after measurement is within plus or minus 3% from the standard value (2 mm or 0.1 inch).

If the measurement values exceed plus or minus 3%, inspect that the stereo optical adapter is not loose and the lens is not dirty, and check measurement values again.

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

0.1 inch 2mm

Forward-view optical
adapter

Side-view optical adapter
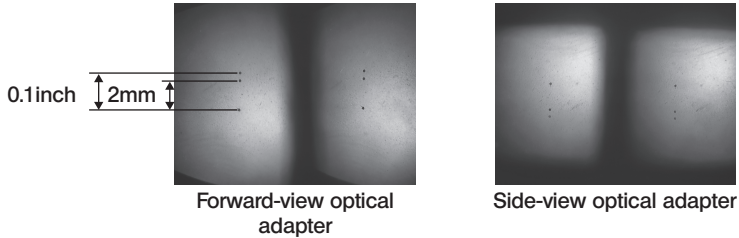
TIP

If the stereo optical adapter is loose, make sure that the O-ring is not detached (see "Attaching and removing the optical adapter" (page 27)).

6 Observing the measurement area on the live screen

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

Monocular view   **Binocular view**
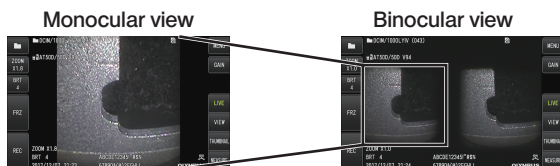
See also "Observing the inspection object" (page 41) for more information on observing the measurement area.

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 the shadow area on the measurement area, move or rotate the position of the insertion tube to change the direction or the distance for capturing images.

    Also, operate the [BRT] lever to darken the image slightly.

· To change the display mode, see page "Using the live screen/freeze screen" (page 63).
· Restriction of monocular view

    – The left image of the binocular view is displayed.
    – The image flipping feature is not usable.

· Restriction of binocular view

    – The image flipping feature is not usable.
    – The zoom function is not available.
    – The gain mode cannot be switched (fixed at Auto).
    – The adjustable brightness range is from 1 to 11.

· 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**

7 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.
Press the [MEAS/OK] joystick or push the [ZOOM] lever downward while the live screen or freeze screen is displayed.
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 view.
- Pressing the [FRZ/REC] button on the spot ranging screen in the live view mode freezes the spot ranging screen.
- The ZOOM function is not available during spot ranging.
- The audio recording function cannot be used for still image recording during spot ranging.

■ 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.

Up to 5mm :
Up to 10mm:
Up to 15mm:
Up to 20mm:
Up to 25mm:
Up to 30mm:
Up to 35mm:
Up to 40mm:
40mm and higher:

Green Yellow Red
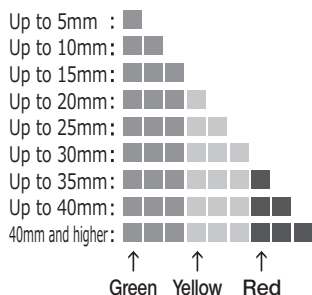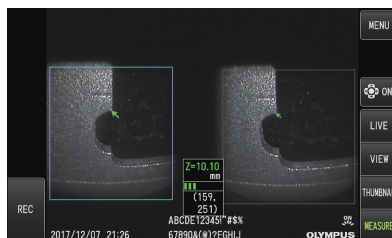
■ Moving the cursor

To move the cursor, operate the [MEAS/OK] joystick by pushing it toward the direction that you want to move the cursor to.

■ Starting the measurement

Press the [MEAS/OK] joystick. The measurement method 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

Pressing the [LIVE] button displays the live screen or freeze screen.
Pressing the [LIVE] button during spot ranging in the freeze screen mode switches to spot ranging in the live screen mode.
Pressing the [LIVE] button during spot ranging in the live screen mode displays the live screen.

TIP

・ Pressing the [MENU] button displays the menu screen.
・ Short-pressing the [VIEW] button displays the view screen while long-pressing the button displays the thumbnail screen.

8   Measurement

1   **While displaying the spot ranging screen or the view screen (image recorded in the binocular view), press the [MEAS/OK] joystick.**

The measurement method selection screen is displayed.

TIP

- Acquire multiple images with different view points, and measure them.
- Check to ensure that the position of measurement on the captured image is consistent.
- The still images recorded in the monocular view cannot be measured.

2   **Select a measurement method.**

Select the measurement method to display the measurement screen.
For more details on the methods of measurement, refer to "Measurement method types" (page 93).

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

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

4   **Record the measurement results.**

Long-press the [FRZ/REC] button to record the image with the measurement results.

5   **Exit from measurement.**

Press 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 live screen. Select "CANCEL" to return to the measurement screen.

■ Checking measurement values

The measurement values must be checked before and after measurement.
See "Checking measurement values" (page 84) for details about operations.

Measurement screen

■ Explanation of the measurement screen

No.	Item
1	**Measurement method icon**
2	**Cursor** Specifies a measurement point or reference point.
3	**Left image area**
4	**Point** Indicates a specified measurement point or reference point.
5	**Object distance** 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 88)) is displayed.
6	**Right image area** The three most recent measurement results are displayed (but only one measurement result is displayed for the Area/Lines measurement method). The object distance mark (■) (see "Spot ranging screen" (page 88)) indicating the object distance to the measurement point is displayed on the right side of the measurement value.
7	**Corresponding point**

■ Menu display and functions

When the [MENU] button is pressed on the measurement screen
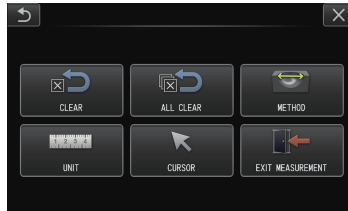
Menu		Available settings
CLEAR	-	**Clears the measurement point or reference point specified last.**
ALL CLEAR	-	**Clears all specified measurement points or reference points.**
METHOD	DISTANCE	**Select a measurement method.**
	POINT TO LINE	/ / /
	DEPTH	See "Measurement method types" (page 93) for details about operations.
	AREA/LINES	
UNIT	-	**Selects the unit of the measurement results.** Selects "mm" or "inch".
CURSOR	-	**Selects a cursor shape.** Selects "✕" or "➤".
EXIT MEASUREMENT	-	**Exits the stereo measurement screen. The display returns to the screen before stereo measurement starts.**

10   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.
There are 4 different types of measurement methods.

■ 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 press the [MEAS/OK] joystick to specify the measurement points.
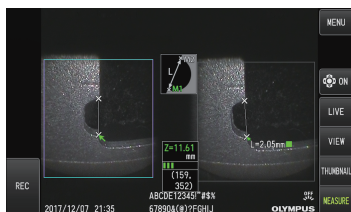
Distance
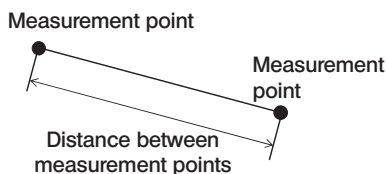
■ Point to line

This mode measures the distance to a measuring point from a reference line that is specified using 2 reference points.
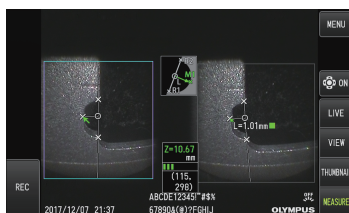
Point to line
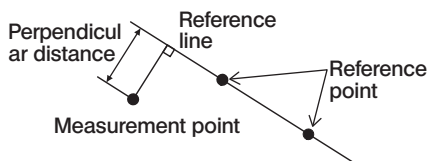
■ Depth

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

Depth
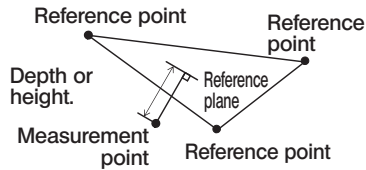
■ Area/Lines

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
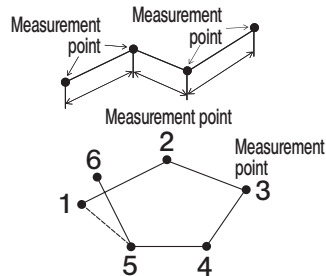
■ Specifying and moving the measurement points

To move the cursor, operate the [MEAS/OK] joystick by pushing it toward the direction that you want to move the cursor to. Press the [MEAS/OK] joystick and specify the number of measuring points needed for each method of measurement in the image area on the left.

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.

■ Re-specifying a measurement point

If the incorrect measured points were specified by mistake, select [CLEAR] in the measurement menu.

■ Re-specifying all measurement points

If you want to restart measuring on the image from the beginning, select [ALL CLEAR] in the measurement menu and clear all specified points.

7 Observation of special light

This unit can also be used for ultraviolet (UV) and infrared (IR) light observation by replacing the LED unit with one that is optionaly.

UV and IR light rays are not visible to the eyes, and therefore care is needed when handling them. Make sure to follow the instructions of a professionally-trained specialist during use.

For more details on replacement of the light source unit, refer to "Replacing the LED unit" (page 96). Also, when a UV or IR LED unit is connected, a confirmation screen will appear when you turn on the power of this unit. Press "OK" and use this unit according to the basic procedures.

7-1 Replacing the LED unit

● Removal

1 Turn of the power.

2 Loosen the 4 bolts on this unit with a hexagonal wrench (comes supplied with the LED unit that is optionaly).
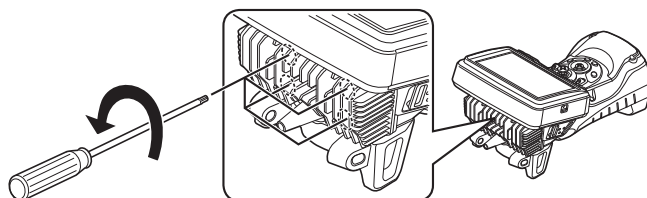
3 Remove the LED unit.
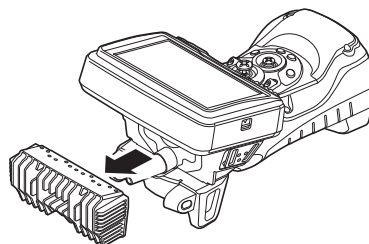
4 Store the removed LED unit safely to prevent dirt from adhering to the inner face of the unit.

· Be careful not to touch the areas around the terminals of this unit.

Terminal area
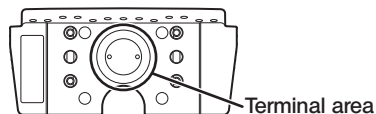
• **Never use the instrument when there is dirt or water droplets inside the LED unit.**
  Otherwise, the waterproof performance between the LED unit and this unit may be lost, or the
  terminals of the LED unit or this unit may be damaged as a result.

TIP

The type of LED unit can
be identified from the label
on it.

Label attachment area

UV light type   :

UV
MAJ-2337   CE 10
             18.05
             MADE IN JAPAN

IR light type   :

IR
MAJ-2338   CE 10
             18.05
             MADE IN JAPAN
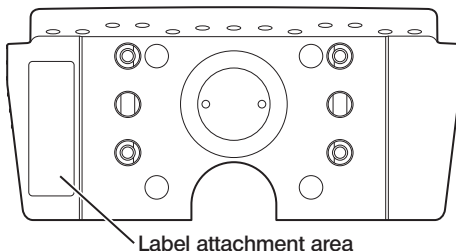
White light type :

WHITE
MAJ-2336   CE 10
             18.05
             MADE IN JAPAN

● **Attachment**

1 **To attach the light source unit, perform the same steps for removing the unit in the reverse order.**

When a UV LED unit is connected, a confirmation screen will appear when you turn on the power of this unit.
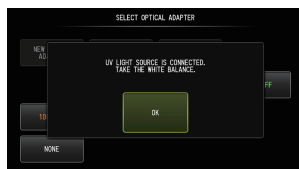
NOTE

• **Fasten the 4 bolts tightly with a hexagonal wrench, and check to ensure that there is no rattling.**
If the bolts come loose during use, the waterproof performance between the LED unit and this unit may be lost, or the terminals of the LED unit or this unit may be damaged as a result.
• **Check to ensure that no dirt, dust or water is adhered to the terminals.**

7-2 Observation using UV light

TIP

· Reset the white balance when using a UV LED unit. Doing so may help to reduce the blue hue of the images.
· Check the LED icon (🔆 or 🔆) to see whether the UV LED unit is illuminated.

Make sure to follow the descriptions in this instruction manual during use.

7-3 Observation using IR light

TIP

· Check the LED icon (🔆 or 🔆) to see whether the IR LED unit is illuminated.
· White streaks may appear only when using the side-view optical adapter but this is not an abnormality. Reducing the brightness may reduce the white streaks.

Make sure to follow the descriptions in this instruction manual during use.

8 Troubleshooting

Inspect the instrument as described in "Pre-operation preparation and inspection" (page 24). 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 "Troubleshooting guide" (page 99). If the problem cannot be resolved by taking the remedial action described, stop using the instrument and contact Evident for repair.

8-1 Troubleshooting guide

1 Error messages

Message	Cause and recommended action
NO SD MEDIA.	SDHC card is not inserted. →Load the SDHC card you use and try again. Or turn OFF the instrument and ON again.
NO microSD MEDIA.	microSDHC card is not inserted. →Load the microSDHC card you use and try again. Or turn OFF the instrument and ON again.
CANNOT ACCESS SD MEDIA.	This unit cannot read from or write to SDHC card. → Close the application (ViSOL Desktop) on the PC or tablet.
SD MEDIA / NOT ENOUGH MEMORY.	The SDHC card is full. →Delete the unnecessary data to free up space, or replace with a new SDHC card. (TIP) The internal memory can store up to about 20 still images. For details, refer to page 52.
microSD MEDIA / NOT ENOUGH MEMORY.	The microSDHC card is full. →Delete the unnecessary data to free up space, or replace with a new microSDHC card.
THIS IMAGE CANNOT BE VIEWED.	The image is not recorded with this instrument. →Only images recorded with this instrument can be displayed.
SD MEDIA ERROR. PLEASE FORMAT THE SD MEDIA.	The format of the SDHC card cannot be recognized. →Format the SDHC card with this instrument.

Message	Cause and recommended action
microSD MEDIA ERROR. PLEASE FORMAT THE microSD MEDIA.	The format of the microSDHC card cannot be recognized. →Format the microSDHC card 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.
SD 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.
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 formating the SDHC card, etc., and immediately replace the battery. Or connect the AC adapter.
HIGH TEMPERATURE (DISTAL END). PLEASE IMMEDIATELY PULL OUT THE INSERTION TUBE.	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. TIP This message will appear before the atmospheric temperature of the distal end reaches the maximum operating ambient temperature.
HIGH TEMPERATURE (MAIN UNIT). PLEASE TURN OFF THE POWER.	The self-check function was activated to prompt termination of the inspection when the internal temperature is too high. →Stop inspection temporarily, allow this instrument to cool down before turning the power back on again.
OVER CURRENT (ARTICULATION MOTOR). PLEASE TURN OFF THE POWER.	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.

Problem	Cause and recommended action
Illumination does not light.	"LIGHT" in the menu is not set to ON or ECO. → Set to ON or ECO.
	The LED unit is not correctly installed. →Install the optical adapter again according to the correct procedures (see "Replacing the LED unit" (page 96)).
The optical adapter cannot be attached to the insertion tube.	A foreign object is stuck to the screws. →Wipe with a clean piece of gauze or a cotton swab.
	The optical adapter in use is not a designated optical adapter for this system. →Use the designated optical adapter.
	The installation procedure is not correct. →Install the optical adapter again according to the correct procedures (see "Attaching and removing the optical adapter" (page 27)).
The optical adapter cannot be removed from the insertion tube.	The installation procedure is not correct. →Repeat the installation and dismantlement procedures (see "Attaching and removing the optical adapter" (page 27)).
The system cannot be turned ON.	The AC adapter or the battery is not connected. →Connect the AC adapter or the battery correctly (see "Preparing the power supply" (page 24)).
	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 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 (see "Attaching and removing the optical adapter" (page 27)).
	The external monitor is not adjusted appropriately. →Adjust the external monitor appropriately.

Problem	Cause and recommended action
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] lever to adjust it to the appropriate setting.
	The external monitor is not adjusted appropriately. →Adjust the external monitor appropriately.
	The optical adapter is loose. →Attach the optical adapter properly (see "Attaching and removing the optical adapter" (page 27)).
Color reproduction is poor.	The white balance is not set properly. →Adjust white balance again.
The noise is noticeable on the image.	The automatic brightness control is not set appropriately. →Use the [BRT] lever to adjust it to the appropriate setting.
	Dynamic Noise Reduction is not set to ON. → Adjust the noise reduction to the appropriate setting in [DYNAMIC 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 this instrument.

8-2 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. The 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.

9 Storage and maintenance

9-1 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 "Using the battery" (page 24).

9-2 Replacing the O-ring

Replace the O-ring using the spare ones that come supplied with the optical adapter.

Replace the O-ring periodically.

The position to attach the O-ring differs between 6-mm type and 4-mm type. Refer to "Distal end/ optical adapter nomenclature" (page 16) and "Attaching and removing the optical adapter" (page 27), and attach the O-ring at the correct position.

9-3 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.

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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
· Use a piece of clean, soft gauze or cotton swab to wipe off dirt and water.
· Use the brush to brush away dirt accumulated in the groove.
· Press a piece of soft gauze or paper that is soaked with an abundant amount of commercially available dehydrated ethanol or isopropyl alcohol against the front of the optical adapter.
· Press a dry piece of soft gauze of paper against it to absorb the dehydrated ethanol or isopropyl alcohol.

Dirt or water droplets on the inner surface of the optical adapter
Perform cleaning following the steps from ①→②→③ until no dirt is attached to the cotton bud. Use the brush to brush away dirt accumulated in the groove.
Also, for thorough cleaning, turn the optical adapter while doing (2) and (3).
Best results can be obtained using commercially available absolute ethanol or isopropyl alcohol.
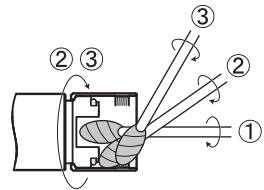
NOTE

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

4   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.

5   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. Wipe away any dirt or water droplets on the inner face of the battery compartment and interface doors, as well as the mounting parts of the main unit.
Air-blow to remove dust and the like from the areas around the lens and terminals of the LED unit without touching them directly.

9-4 Storage precautions

Store this product under normal room temperature and humidity.

1 Turn OFF the power and remove the battery or unplug the AC adapter.

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

10 Specifications

10-1 Operating environment

Item		Specifications
Operating temperatures		
	Insertion tube	In air : -25 to 100 °C In water : 10 to 30 ℃
	Parts other than insertion tube	In air : -10 to 40 °C (Battery-powered operation) : 0 to 40 °C (AC adapter-powered operation) : 0 to 40 °C (Battery charging in progress)
Operating atmospheric pressure		
	Insertion tube	In air : Normal pressure (1,013 hPa) In water : IV94 series 1,013 to 1,368 hPa (up to water depth 3.5m) In water : IV96 series 1,013 to 2,026 hPa (up to water depth 10m)
	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.
	Parts other than insertion tube	
Waterproofing		
	Insertion tube	Waterproof construction. Can be used underwater with the optical adapter attached. The stereo measurement is not available underwater.
	Parts other than insertion tube	Water resistant proof construction. Use underwater is not supported. This unit is not drip-proof when the battery compartment door, other doors or caps are open.
Contamination level		
	All parts	2 (Including AC adapter)

> **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).
> ・ This instrument can be used outdoor if all the doors and caps are firmly closed when using the battery.

10-2 Other specifications

1 | Other specifications

Item		Specifications
Optical system		
	For optical adapter specifications, see "Optical adapter specifications" (page 112).	
	Illumination	Light from the LED 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
	Distal end rigid section length	See the specifications of the distal end rigid section length of the optical adapter.
	Angulation	IV9420GL, IV9435GL, IV9420GL-W: 130° IV9620GL, IV9635GL: 150° IV96100GL: 110°
Flexible section		
	Flexibility	IV94 series: Fixed hard corrugated tube from the distal end of the insertion tube to the main 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
	Index lines	An orange line is displayed at the position of 500 mm from the distal end of the insertion tube. 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). 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.
Total length		IV9420GL, IV9620GL, IV9420GL-W: 2.0 m IV9435GL, IV9635GL: 3.5 m IV96100GL: 10.0 m

Item		Specifications
Dimensions		128(W) x 203(H) x 110(D) mm (without insertion tube)
Weight (including battery and SDHC card)		IV9420GL: 1.15 kg IV9435GL: 1.21 kg IV9620GL: 1.23 kg IV9635GL: 1.34 kg IV96100GL: 1.83 kg IV9420GL-W: 1.16 kg
LCD panel		4.3 inch TFT full-color low reflective-coating type
Input/Output connector		
	USB connector	A connector, USB 2.0 compatible
	Headset terminal	ø3.5 mm 4-pole plug (CTIA-compliant)
	HDMI terminal	Type C
Power supply		
	Battery	Specified battery (Lithium Ion) Model: BLH-1 (manufactured by Evident) Nominal voltage : DC7.4V Nominal capacity : 12.8 Wh Battery powered operating time: Approximately 90 minutes (based on new battery) For details, refer to the instruction manual that is supplied with this unit.
	AC adapter for main unit	Model : Made by UNIFIVE, UNI324-1220 I/P : AC 100-240 V 50/60 Hz 0.6 A O/P : DC 12.0 V 2.0 A 24.0 W
Power consumption		10.5 W
Recording media		SDHC card and microSDHC card (For recommended products, please contact Evident.)
Still image recording		
	Resolution	H768 × V576(Pixel)
	Recording format	Records in the JPEG compression format.
Still image playback		
	Restrictions	Images recorded with the instrument can be played back.
Battery charger (optional)	Model	BCH-1
	Input voltage	AC100 to 240 V
	Frequency	50/60 Hz
	For details, refer to the instruction manual of your battery charger	

Item		Specifications
Movie recording		
	Resolution	H768 × 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.)
	Frame rate	30 fps / 60 fps
Movie playback		
	Restrictions	Images recorded with the instrument can be played back.
Movie output		
	Resolution	H1280 × V720 (Pixel)
	Output signal format	Outputs in the HDMI signal format
	Frame rate	60 fps
Manufacturer		EVIDENT CORPORATION 6666 Inatomi, Tatsuno-machi, Kamiina-gun, Nagano 399-0495, 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.
- The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc. in the United States and other countries.

HDMI®
HIGH-DEFINITION MULTIMEDIA INTERFACE

- The SDHC and microSDHC logos as well as SD-3C and LLC are trademarks.

- IOS is a trademark or registered trademark of Cisco (U.S.).
- App Store is a service mark of Apple Inc.

2 External application standard

EMC Information	This product conforms to the following. This product is applied with the requirements of standard IEC/EN61326-1 concerning electromagnetic compatibility. • Emission Class A, applied to industrial environment requirements. • Immunity Applied to industrial environment requirements. Some interference may occur if this product is used in domestic location.
FCC Information	This product conforms to the following. • 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.
WEEE Directive	The following applies to the mark to the left. In accordance with European Directive on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately. Refer to your local Evident distributor for return and/or collection systems available in your country.
Chinese RoHS Directive	This logo is the logos to be applied to electrical and electronic products sold in China based on "Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products" and "Requirements as to logo for the restricted use of hazardous substances in the electrical and electronic products". (Note) The number of logo indicates the years of period during which the hazardous substances contained in the electrical and electronic products will not leak or mutate suddenly under normal conditions It does not indicate the years of period during which the functional performance of product is warranted.

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(ii) DECODING MPEG-4 VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL AND NONCOMMERTIAL ACTIVITIY AND/OR
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10-3 Optical adapter specifications

1 For 4-mm type insertion tube

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

Name		AT120D/NF -IV94G	AT120D/FF -IV94G	AT100S/NF -IV94G	AT100S/FF -IV94G
Product abbreviation		E120N	E120F	E100N	E100F
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]	19.0 mm	19.0 mm	21.7 mm	21.7 mm

Name		AT80D/FF -IV94G	AT50D/50D -IV94[*4]	AT50S/50S -IV94[*4]
Product abbreviation		E80F	50/50D	50/50S
Character color		Green	Blue	Blue
Optical system	Field of view	80°	50° / 50°	50° / 50°
	Direction of view	Forward view	Forward view / Forward view	Side-view / Side-view
	Depth of field[*1]	35 to ∞ mm	5 to ∞ mm	4 to ∞ mm
Distal end	Outer diameter[*2]	ø4.0 mm	ø4.0 mm	ø4.0 mm
	Rigid distal end length[*3]	19.0 mm	24.3 mm	28.4 mm

The IV9420GL-W unit is used exclusively for forward view, thus the optical adapter is not replaceable.

Name		IV9420GL-W
Product abbreviation		-
Character color		-
Optical system	Field of view	120°
	Direction of view	Forward view
	Depth of field*1	4 to ∞ mm
Distal end	Outer diameter*2	ø4.0 mm
	Rigid distal end length*3	19.0 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

*4 The scaler measurement cannot be used.

2   For 6-mm type insertion tube

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

Name		AT40D -IV96G	AT80D/NF -IV96G	AT80D/FF -IV96G	AT120D/NF -IV96G	AT120D/FF -IV96G
Product abbreviation		E40F	E80N	E80F	E120N	E120F
Character color		Black	Red	Green	Red	Green
Optical system	Field of view	40°	80°	80°	120°	120°
	Direction of view	Forward view	Forward view	Forward view	Forward view	Forward view
	Depth of field[*1]	200 to ∞ mm	9 to ∞ mm	35 to ∞ mm	2 to 200 mm	19 to ∞ mm
Distal end	Outer diameter[*2]	ø6.0 mm	ø6.0 mm	ø6.0 mm	ø6.0 mm	ø6.0 mm
	Rigid distal end length[*3]	18.4 mm	18.9 mm	18.8 mm	18.9 mm	18.8 mm

Name		AT80S -IV96G	AT120S/ NF -IV96G	AT120S/ FF -IV96G	AT60D/ 60D -IV96[*4]	AT60S/ 60S -IV96[*4]	AT220D -IV76[*4]	AT100D/ 100S -IV76[*4]
Product abbreviation		E80F	E120N	E120F	60/60D	60/60S	-	-
Character color		Black	Red	Green	Blue	Blue	-	-
Optical system	Field of view	80°	120°	120°	60° / 60°	60° / 60°	220°	100° / 100°
	Direction of view	Side-view	Side-view	Side-view	Forward view / Forward view	Side-view / Side-view	Forward view	Forward view / Side-view
	Depth of field[*1]	15 to ∞ mm	1 to 25 mm	3 to ∞ mm	5 to ∞ mm	4 to ∞ mm	1.6 to ∞ mm	2.0 to ∞ mm
Distal end	Outer diameter[*2]	ø6.0 mm	ø6.0 mm	ø6.0 mm	ø6.0 mm	ø6.0 mm	ø8.4 mm	ø6.0 mm
	Rigid distal end length[*3]	24.2 mm	24.2 mm	24.2 mm	24.9 mm	31.3 mm	21.1 mm	29.5 mm

*1   Indicates the range within which the image can be viewed clearly.
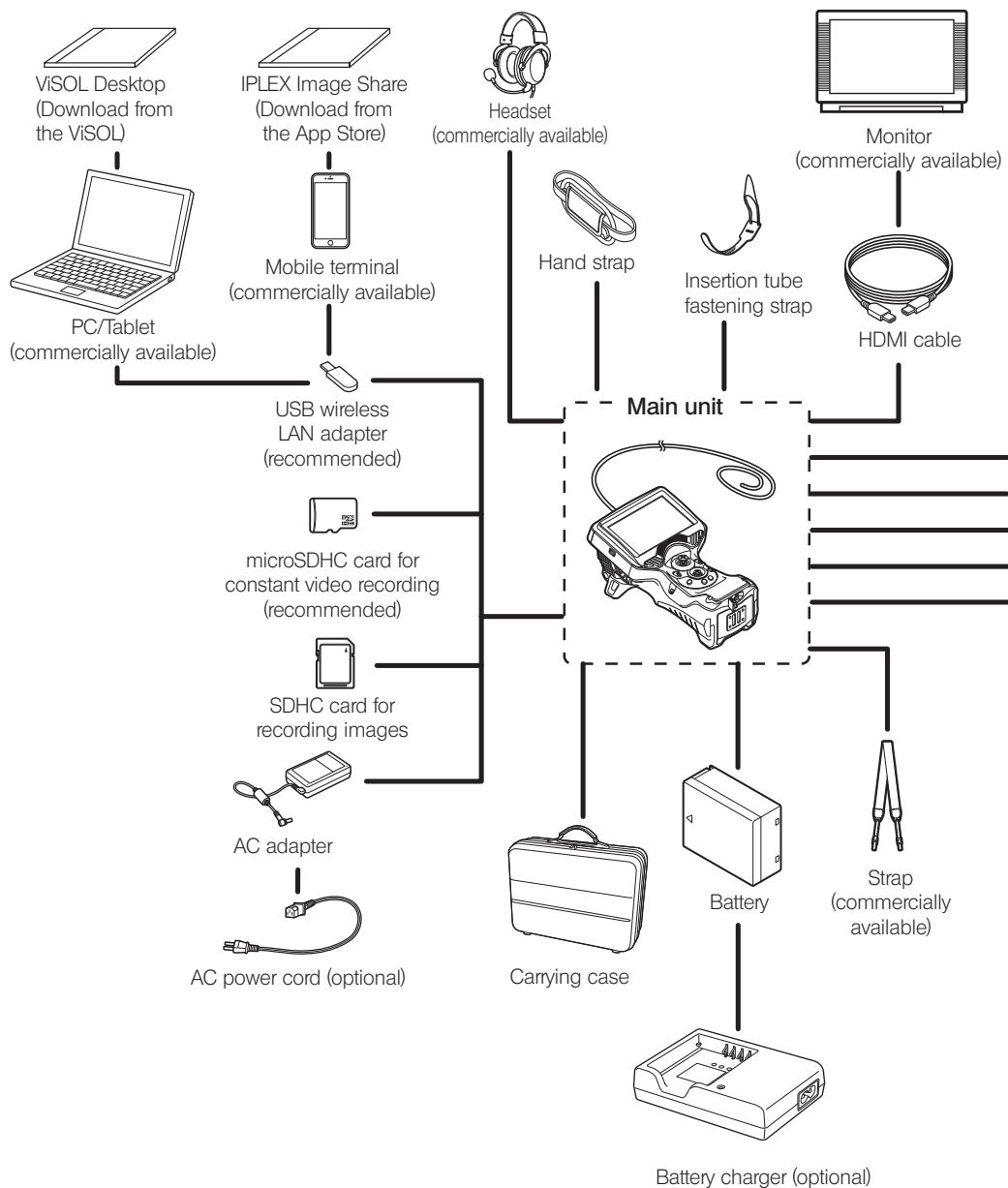
*2   Can be inserted into a ø6.0 mm hole when the optical adapter is mounted on the insertion tube. (Only AT220D-IV76 can be inserted into a ø8.4 mm hole.)

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

*4   The scaler measurement cannot be used.

Appendix

System chart

ViSOL Desktop
(Download from
the ViSOL)

IPLEX Image Share
(Download from
the App Store)

Headset
(commercially available)

Monitor
(commercially available)

Mobile terminal
(commercially available)

Hand strap

Insertion tube
fastening strap

HDMI cable

PC/Tablet
(commercially available)

USB wireless
LAN adapter
(recommended)

Main unit

microSDHC card for
constant video recording
(recommended)

SDHC card for
recording images

AC adapter

AC power cord (optional)

Carrying case

Battery

Strap
(commercially
available)

Battery charger (optional)

LED unit
  White light type (optional)
    ・MAJ-2336
  UV light type (optional)
    ・MAJ-2337
  IR light type (optional)
    ・MAJ-2338

Optical adapter (optional)

  4-mm type
    ・AT120D/NF-IV94G
    ・AT120D/FF-IV94G
    ・AT100S/NF-IV94G
    ・AT100S/FF-IV94G
    ・AT80D/FF-IV94G
    ・AT50D/50D-IV94
    ・AT50S/50S-IV94

  6-mm type
    ・AT40D-IV96G
    ・AT80D/NF-IV96G
    ・AT80D/FF-IV96G
    ・AT120D/NF-IV96G
    ・AT120D/FF-IV96G
    ・AT80S-IV96G
    ・AT120S/NF-IV96G
    ・AT120S/FF-IV96G
    ・AT60D/60D-IV96
    ・AT60S/60S-IV96
    ・AT220D-IV76
    ・AT100D/100S-IV76

Guide tube (optional)

10-m type
  ・MAJ-2342

LED guide tube (optional)

  ・MAJ-2535

Tip cap

Rigid sleeve (optional)

  4-mm type
    ・MAJ-1737
  6-mm type
    ・MAJ-1253

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