Instruction manual MAJ-2535 LED Guide Tube

Industrial Endoscope Accessory

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Introduction

Intended use

This product is an LED guide tube that is intended to be used in a normal environment in combination with an industrial endoscope that has a tip diameter of 6.0 mm or less. 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 us.

Restrictions

This instrument is intended to be used in combination with our ø4-mm or ø6-mm industrial endoscope.

Note that use in combination with any other device not only creates the risk of abnormal operations but may also damage the device, which would not be covered by the warranty.

Safety precautions

Use of this product in ways not described in the instruction manual cannot be guaranteed to be safe and also risk damage to the product. Be sure to follow this instruction manual when using this instrument.

The following symbols are used throughout this instruction manual.
ADANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury or damage of observation object.
WARNING : Indicates a potentially hazardous situation which, if not avoided, could result in death, serious injury or damage of observation object.
CAUTION : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or potential material damage.
NOTE : Indicates a potential situation which, if not avoided, may result in failure of this instrument.
TIP : Indicates additional helpful know-how and information.

A 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. If the equipment is used in a manner not specified by us, the protection provided by the equipment may be impaired.

ADANGER

- 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.
- \cdot 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.

MWARNING

· 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 us are allowed to repair the instrument. We are not liable for any accidents or the instrument damage that occurs as a result of repairs attempted by personnel who are not authorized by us.

• 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.

MWARNING

 Do not insert the tube into an inspection object that is operating or electrically energized.

The tube could be damaged, such as by being trapped inside the inspection object; or the tube could contact something and cause an electric shock

• Before storing the instrument in its carrying case, be sure to turn off the power and remove the batteries.

Leaving the batteries installed while the instrument is stored may cause the batteries to overheat and cause a fire.

ACAUTION

• Do not use the instrument in any environment (including strongly radioactive areas) other than the specified operating environment.

Otherwise, unexpected accidents, such as damage to the tube, may occur.

- 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
- Be very careful of the temperature of the distal end and the tube immediately after using them in high-temperature environments because they cannot cool down immediately.

Otherwise, you may get burned.

• Do not grip the control for a prolonged period of time when using the unit in a highly humid environment.

There is a risk of receiving low-temperature burns. Wear gloves, or take other measures, to prevent low-temperature burns.

• If you sense any abnormality while inserting the tube, just slowly remove it, without forcibly inserting it any further.

 If the insertion tube is caught on something while pulling it out, rotate it gently as you pull it out.

- Note the following precautions when handling the distal end of the tube.
 - Do not subject the distal end to severe impact or pulling.
 - Do not hold the distal end of the tube as you move the instrument.
- · Do not clean with running water

Otherwise, water creates the risk of electric shock. The unit is waterproof, except for the tube, when the battery door is tightly closed. Do not use or store the instrument where it may be submerged in water.

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 subject 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 tube into an 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 allow any liquids other than water, saltwater, machine oil or diesel oil to stick to the tube.

The tube may be damaged.

- · Note the following precautions when handling the battery door.
 - Do not open or close the door 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 when stored
- Note the following precautions when taking the instrument out of the guide-tube bag.
 - Do not hold by tube to lift
 - The instrument may be damaged.
- Note the following precautions when storing the instrument in the guidetube bag.

Make sure that the distal end has cooled down sufficiently before storing it.
Do not lift the bag when the guide-tube bag 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.

ASafety precautions - Illumination light precautions

This product uses high intensity illumination in order to secure sufficient brightness while inspecting an inspection object. When the light of the product is turned on, an intense light comes out of the distal end. Be sure to follow the precautions described below when using the product.

ACAUTION

• Turn OFF the illumination if not necessary.

If the illumination light enters your eyes, your eyes may be injured. If you look at the illumination light for a long time, even from the edge of your field of view, your eyes may be injured.

If there is any possibility that the illumination light enter someone's eyes, turn off the illumination light when not necessary.

· Do not stare at the illumination light.

Otherwise, your eyes may get injured. If you look at the illumination light for a long time even though looking at it diagonally or from the side, your eyes may get injured.

· Do not look at the light reflected from the illumination light.

The light reflected from the illumination light may be collected depending on the shape of the reflection surface. If such reflected light enters your eyes, your eyes may get injured.

• Alert people around you about the warnings on this page.

People around you may get eye injury. Use the equipment in accordance with the regulations for Workers Health and Safety, if any.

• When the illumination light is turned on, do not leave the distal end of the tube near flammable substances for a long time.

Otherwise, fire may result.

Information of IEC62471

• RISK GROUP1

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



• Confirm the risk group described in the instruction manual of the endoscope being used.

A Safety precautions - Battery precautions -

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.

ADANGER

- Use AAA size nickel metal hydride batteries that conform to IEC62133-1.
- · Do not subject the battery to strong impact.
- \cdot Do not allow the 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 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 gets inside, remove the batteries, and immediately contact us.

• 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.
- Remove the batteries from the LED guide tube, if you plan not to use it for a long period, and store it in a dry place.

Otherwise, the batteries may leak fluid or generate heat, which could cause a fire or injury.

- Keep the battery out of the reach of small children.
- If liquid leaking from the batteries comes into contact with your body, rinse it off immediately with clean water from the tap, etc. and seek medical attention if necessary.

ACAUTION

• 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 the malfunction.

- If you are experiencing problems removing the battery from the instrument, do not attempt to remove it forcibly. Contact us.
- Contact the airlines in advance if you plan to transport the battery by aircraft.

ACAUTION

- 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 subjected to water wetting, high temperature, high humidity, low temperature and large amounts of dust or particulate
 - Locations exposed to direct sunlight or radiation
 - Locations subject 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 use, charge or store the batteries in hot locations, such as in locations exposed to direct sunlight, in an automobile in the hot sun, or near a heater.
- Do not use a battery if it is leaking fluid, discolored, deformed, smells strange, or is abnormal in any other way.
- Do not immerse the batteries in fresh water or sea water, or allow the batteries to get wet.
- When disposing of a battery, be sure to do so in accordance with all local laws, rules, and regulations.

Before disposing of batteries, check your local laws, rules, and regulations and follow them accordingly.

(NOTE)

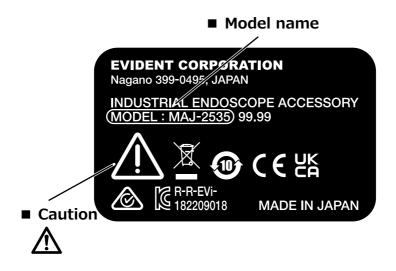
- The contamination of battery terminals with sweat or oil will cause contact failure. If the battery is dirty, wipe it with a dry cloth before use.
- Use the battery correctly. If the battery is used incorrectly, the battery fluid leakage, heat generation or damage may result. Insert the battery in the correct orientation when replacing it.

Rating plate/caution plate

Safety precautions are described on the label attached to the product. Study the meaning of the safety symbols and always use the product in the safest possible manner.

Mark	Meaning
	Indicates a non-specific general hazard. Follow the precautions de- scribed in the instruction manual.

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



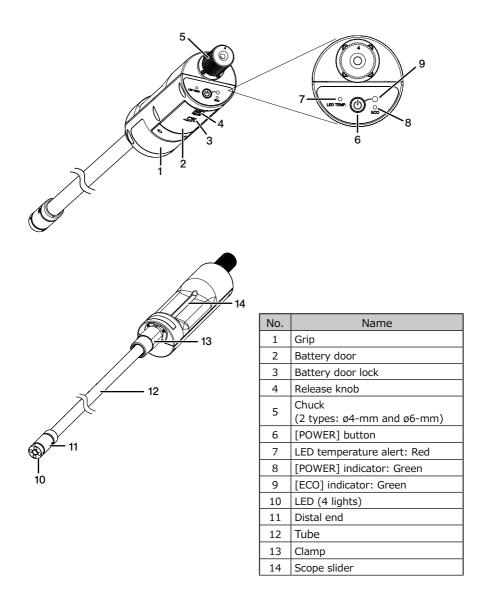
1-1 Unpacking

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

Name	Quantity
LED Guide Tube Main Unit	1
ø4-mm chuck (already installed on LED Guide Tube)	1
ø6-mm chuck	1
Instruction manual (safety precautions)	1
Guide tube bag	1



2-1 Nomenclature





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 "5 Troubleshoot-ing" (page 16).

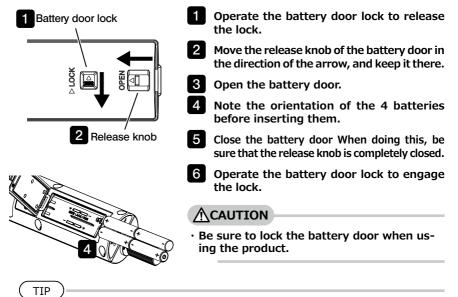
Inspections are not only required before use but also should be conducted periodically.

NOTE

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

3-1 Putting batteries into the LED Guide Tube

Install the batteries according to the following procedure.



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.

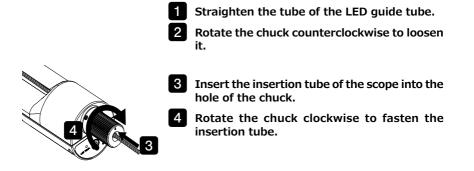
It is recommended to prepare multiple spare batteries if long hours of battery-powered operations are expected.

The batteries cannot be charged by the guide tube. For information on charging the battery, refer to the instruction manual provided with the battery charger.

The battery is a consumable item.

3-2 Attaching/removing the LED guide tube

Attaching the LED guide tube





Adjusting the position, at which the insertion tube is fastened, according to conditions, makes viewing the inspection object easier.

Change to the ø6-mm chuck when using a ø6-mm scope.

Removing the LED guide tube

Remove the LED guide tube by reversing the procedure for attaching it.

3-3 Pre-use/post-use inspections

NOTE

Check the following inspection items before and after using the instrument.

Inspection location	Item	If abnormality is discovered
LED Guide Tube	Any breaks, warping, or looseness in the exterior?	Contact us.
	Is the O-ring inside the chuck missing or broken, etc.?	
	Any fluid leakage, deformation, cracks or other abnormalities of the battery?	
	Any dirt or water droplets on the glass of the distal end?	See "6 Storage and maintenance" (page 17).
	Any deformation or looseness of the distal end? Never use it if the distal end is loose. Other- wise, the loose parts may fall off.	Contact us.
	Any dents, buckling, or breaks on the tube?	
	Any fraying or ripping of the guide tube bag?	
	Is the specialized guide tube bag being used? Use of something other than the specialized bag may cause the LED guide tube to mal- function or be damaged.	

4 Basic operation

4-1 Bend the tube of the LED guide tube.

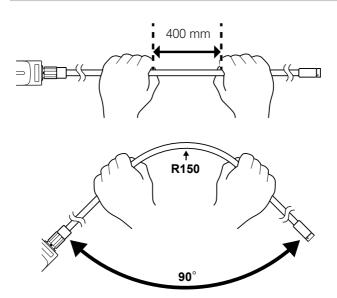
Bend the tube of the LED guide tube according to the shape of the object being inspected.

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.



4-2 Turning on the LED

Each time the [POWER] button (\bigcirc) is pressed, the LED switches from \rightarrow Normal light \rightarrow Economy light \rightarrow Off.

- ① To turn on the LED, press and hold, for 2 seconds, the [POWER] button (心) on the back end of the grip, to turn on the normal light. The normal light can be used in environments up to 80 °C.
- (2) Briefly press the [POWER] button (\bigcirc) again to switch to the economy light. The economy light can be used in environments up to 100 °C.
- ③ Short press the [POWER] button (\bigcirc) again to turn off the light.

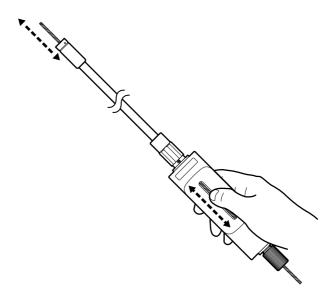
4-3 Inserting into and observing an object



Hold the grip of the LED guide tube, and insert it into the object to be observed.

2

Adjust the position at which to insert the scope to suit viewing conditions. While the chuck on the LED guide tube is loose, you can extend and retract the distal end in relation to the LED guide tube by pressing, with your thumb or some other finger, on the distal end that is exposed on the side of the grip as shown in the following diagram.





3 To fix the position of the distal end, tighten the chuck.

NOTE

Do not operate the angulation section while it is inside the LED guide tube. Doing so could damage the angulation section.

5 Troubleshooting

Inspect the instrument as described in "3 Preparation and inspection before use" (page 11). If there are any obvious malfunctions, do not use the instrument and contact us for repairs. If a slightest irregularity is suspected, do not use the instrument and perform the actions described in "5-1 Troubleshooting guide". If the problem cannot be resolved by taking the remedial action described, stop using the instrument and contact us for repair.

5-1 Troubleshooting guide

If the following symptoms occur, try the recommended actions in the table below.

Problem	Cause and recommended action
LED illumination light does not light.	The [POWER] button ($$) is turned off (green LED is not lit). \rightarrow Turn on the [POWER] button (green LED lights).
	Batteries are low on power. \rightarrow Replace them with spare batteries. Or, charge the batteries.
	Batteries are facing the wrong way. \rightarrow Face the batteries the correct way.
LED temperature alert is flashing red.	 The LED in the tip has exceeded the maximum temperature at which the normal light can be used. → If you are using the normal light, briefly press the [POWER] button to switch to the economy light. If the LED temperature alert changes from flashing to lit, immediately pull the insertion tube out of the object being observed.
LED temperature alert lights red, and the LED illumination turns off.	The LED in the tip has exceeded the maximum temperature so the LED illumi- nation has turned off to protect the device. → Immediately pull the LED guide tube out of the object being observed.

5-2 Requesting repair of the product

Contact us 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. We will not repair an instrument contaminated by noxious substances.

6-1 Replacing the batteries

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.

For details about how to load and remove the battery, see "3-1 Putting batteries into the LED Guide Tube" (page 11).

6-2 Cleaning components

1 Cleaning the tube

Dirt or other foreign material on the tube

Wipe with a clean soft cloth.

Dirty water, machine oil, or other liquid on the 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 tube immediately after pulling it out. As time passes, the dirt will harden and stick to the tube, causing it to corrode.

2 Cleaning the distal end

Dirt or water droplets on the glass of the distal end

Hold the distal end and use a clean, soft piece of gauze or a cotton swab to wipe off the dirt or water droplets.

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

3 Cleaning the grip

If the grip is dirty, wipe it with a soft cloth moistened with clean water. Then, lightly wipe it with a clean and dry cloth. Also, wipe away any dirt or water droplets from inside the battery door.

6-3 Storage precautions

Store this product under normal room temperature and humidity.



Turn off the LED and remove the batteries.

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

7 Specifications

7-1 Operating environment

Item	Specifications
Operable location	
All parts	Outdoor use (Only when the battery door is securely closed.)
Operating temperatu	res
Tube	In air: -25 to 100 °C
Main unit	-10 to 40°C
Operating atmosphered	ric pressure
All parts	In air: Normal pressure (1,013 hPa)
Operating environment altitude	
All parts	Up to altitude 2,000m
Operating environment humidity	
All parts	15 to 90% (relative humidity)
Liquid resistance	
All parts	No problem even if exposed to machine oil, light oil or 5% saline solution.
Waterproofness	
All parts	Manufactured to be water resistant. Use underwater is not supported. The instrument is not water-resistant if the battery door is open.
Pollution degree	
All parts	2

(NOTE)

When using this product together with an IPLEX series device, use that IPLEX series device, which is being used together with the product, in an operating environment suitable for the product.

7-2 Major specifications

1 Major specifications

Item	Specifications
Outer diameter of distal end	ø17.9mm
Distal end rigid section length	45mm
Outer diameter of tube	ø13mm
Length of tube	889mm
Outer diameter of main unit (including projections)	ø50mm × 240mm
Weight (including batteries)	500g
Power supply	4 AAA size nickel metal hydride batteries, recom- mended by us, that conform to IEC62133-1
Rated power supply	4.8 V (1.2 V × 4 in series)
Continuous lighting time	 Normal mode: About 3 hours Economy mode: About 6 hours The time lit continuously is based on in-house testing (new product and batteries at room temperature). This could change extensively depending on the batteries that are used and the operating conditions. Nickel metal hydride batteries that have been used repeatedly have a shortened continuous usage time.

2 External application standard

EMC Information	This product is a part of the system product which complies with the CE marking. Please refer to the instruction manual of your system product for the safety instructions related to the CE marking.
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 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.
	FCC Supplier's Declaration of Conformity Hereby declares that the product Product name: Industrial Endoscope Accessory Model Number: MAJ-2535 Conforms to the following specifications: FCC Part 15, Subpart B, Section 15.107 and Section 15.109 Supplementary Information: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Responsible Party Name: Evident Scientific, Inc. Address: 48 Woerd Ave Waltham, MA 02453, USA Phone Number: 781-419-3900
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 our 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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Life science solutions

Service Center



https://www.olympus-lifescience.com/ support/service/

Official website



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Industrial solutions

Service Center



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Official website



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