

Instructions

U-LGPS

LED and LDP Light Source

To ensure safety, obtain optimum performance and to familiarize yourself fully with the use of this product, we recommend that you study this manual thoroughly before operating this product, and always keep this manual reachable when operating this product.

For details of products covered by this instruction manual, see page 10.

Optical Microscope Accessory

This product is applied with the requirements of standard IEC/EN61326-1 concerning electromagnetic compatibility.

- Immunity Industrial and basic electromagnetic environment

Emissions exceeding the level required by aforementioned standards may occur if this product is electrically connected to other equipment.

Research, Industrial, and In vitro diagnostic medical use Products

This product is categorized as FCC Part15 Class A exempt device. Using this product may affect other equipment in the environment. The operator of this exempted product shall be required to stop operating the product upon a finding by the Commission or its representative that the product is causing harmful interference. Operation shall not resume until the condition causing the harmful interference has been corrected.



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 in EU for return and/or collection systems available in your country.

For Korea only

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

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Concept of this instruction manual

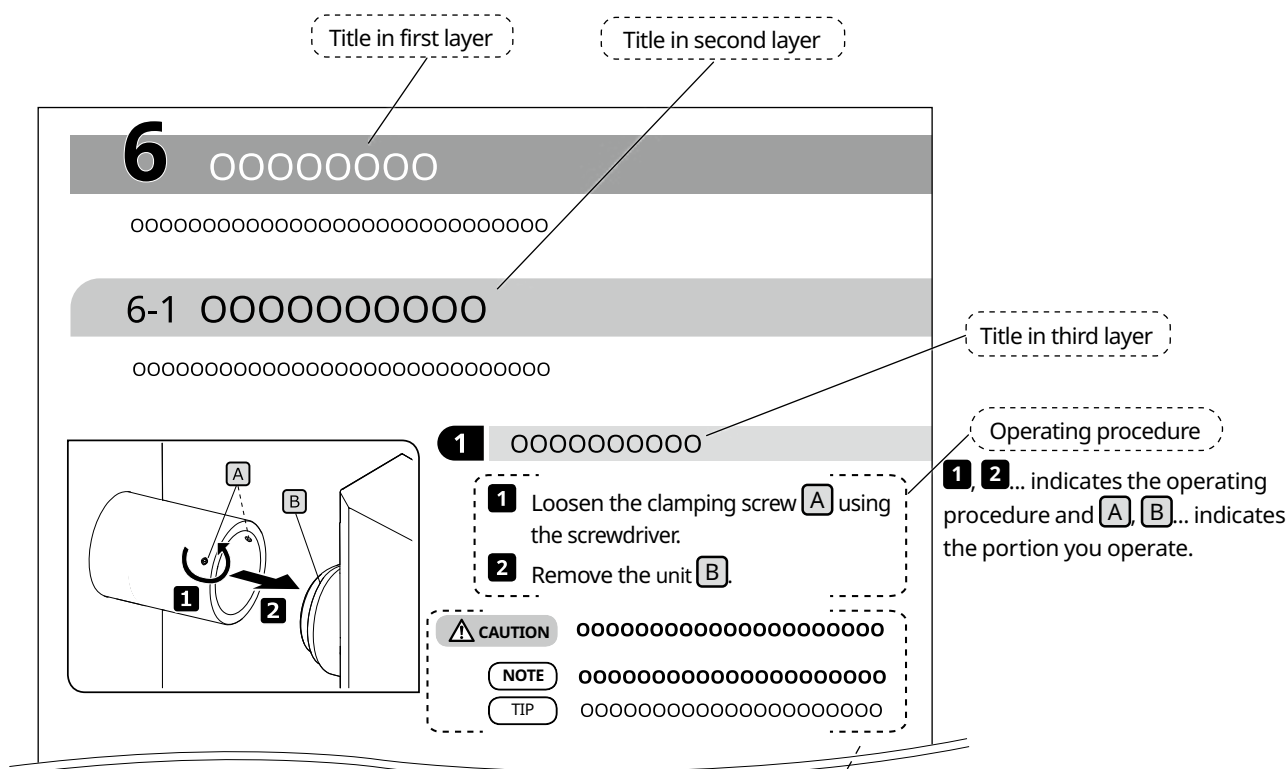
This instruction manual describes only the contents related to U-LGPS (LED and LDP light source).
When using this product, read all the instruction manuals supplied with the units you purchased together with this manual.

Applicable user of this instruction manual

This instruction manual applies to users who use this product according to "Intended use" and our distributors.

How to read this instruction manual

This instruction manual is created as follows.



Cautions and references

The following symbols are used in this instruction manual.

- ⚠ WARNING** : Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- ⚠ CAUTION** : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
- NOTE** : Indicates a potentially hazardous situation which, if not avoided, may result in damage to the product or other property and/or may cause problems.
- TIP** : Indicates the useful knowledge or information for use.

Product Concept

Product outline

U-LGPS (LED and LDP Light Source) is a light source used for observing a sample in combination with the microscope.

Intended Use

This product is used for research, industrial and in vitro diagnostic medical purposes in combination with microscopes. For details, refer to the instruction manual for the microscope system to be combined.

Cautions and confirmation before use

This product includes the following items. If any item is missing or damaged, contact us.

- U-LGPS
- USB cable
- Instruction manual (Safety)

Safety precautions

If the product is used in a manner not specified by this manual, the safety of the user may be imperiled. In addition, the product may also be damaged. Always use the product according to this instruction manual.

Installation



WARNING Secure the space of 5 cm or more around the product.

Otherwise, the ventilation route is not secured and the heat is filled inside the product, which may cause a fire.



CAUTION Install the product on a sturdy, level table or bench.

For safety in particular, do not place a mat, etc. under the product. Otherwise, the product may overturn.

Laser safety



CAUTION Never peel off the warning label.

Warning label position: Right side surface of U-LGPS

RISK GROUP 3 — リスクグループ3 — 风险组 3	
WARNING	UV emitted from this product. Avoid eye and skin exposure to unshielded product.
WARNING	Blue light emitted from this product. Do not look at operating lamp. Eye injury may result.
警告	この製品からは紫外線が出力されます。 シールドされていない製品から目や皮膚への露出を避けてください。
警告	この製品からは青色光が出力されます。 動作中の光源を見ないでください。目を傷めることがあります。
警告	此产品发出紫外线。 避免从无防护的产品照射到眼睛或皮肤上。
警告	此产品发出蓝光。 不要看工作中的光源。有时会伤到眼睛。
CLASS 1 LASER PRODUCT IEC60825-1:2014, EN60825-1:2014/A11:2021 クラス1レーザ製品 JIS C 6802:2018 1类激光产品 GB7247.1-2012 Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.	

This product is specified as CLASS 1 laser product.

CLASS 1 LASER PRODUCT (IEC60825-1:2014, EN60825-1:2014/A11:2021)

This product complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

• **Do not remove the cover.**

It is very dangerous because the laser beam equivalent to CLASS 4 is emitted. And the product may also be damaged.

TIP

This product uses the fluorescence of the phosphor excited by the laser beam emitted from the LD bank as the illumination light.

Specifications of LD bank:

- Dominant wavelength: 455±5 nm
- Output: 36 W

Prevention of electric shock



WARNING

- **Never disassemble any part of this product.**

It could cause electric shock or failure of the product.

- **Be sure to turn OFF the main power of the product and then disconnect the power cord from the power cord connector on the product or from the power outlet before performing maintenance, storage or transportation.**

It could cause electric shock or failure of the product.

- **Do not allow any foreign substance into the product.**

In particular, if any metal fragment or similar enters the product, electric shock or failure of the product may be caused.

- **Do not touch the product with wet hands.**

In particular, if you touch the main switch of the power unit or the power cord with wet hands, electric shock, ignition or failure of the product may be caused.


- **When you hear thunder, never touch the product until thunder stops.**

In particular, if you touch the main switch of the power unit or the power cord, an electric shock may be caused.

- **Do not bend, pull or tie the power cord/cables in a bundle.**

The cord/cables could be damaged, causing a fire or an electric shock.

- **Disconnect the power cord from the product when replacing the fuses.**

To avoid electric shock hazards when replacing the fuses, set the main switch of U-LGPS to  (OFF) and disconnect the power cord from the product in advance.

Electric safety



CAUTION

- **Always use the power cord provided by us.**

If the proper power cord is not used, our intended electric safety and the EMC (Electromagnetic Compatibility) performance of the product cannot be assured. If no power cord is provided, please select the proper power

If no power cord is provided, please select the proper power cord by referring to the section "Proper selection of the power cord" at the end of this instruction manual.

- **Always connect the ground terminal.**

Connect the ground terminal of the power cord and that of the power outlet.

If the product is not grounded, our intended electric safety and EMC performance of the product cannot be assured.

- **Do not use the product in close proximity to the sources of strong electromagnetic radiation.**

Proper operation may be interfered. The electromagnetic environment should be evaluated prior to operation of the product.

- **If you feel smoke, odor, abnormal sound or abnormal output, etc., stop using the product immediately.**

- **Disconnect the power cord in case of emergency.**

In case of emergency, disconnect the power cord from the power cord connector on the product or from the power outlet.

Install the product at the location where you can reach the power cord connector or the power outlet at hand to disconnect the power cord quickly.

- **Do not connect or disconnect the power cord, cables and units while the power is on.**

- **Always use the USB cable provided by us.**

If you connect the USB cable that is not provided by us, U-LGPS may not work properly.

Prevention of eye injury



Do not look directly at the light coming out from U-LGPS.

U-LGPS is categorized as Risk Group 3 defined in IEC62471-1 "Photobiological Safety of Lamps and Lamp Systems".

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

Be careful for the possibly hazardous optical radiation emitted from this product and the system with which this product is combined (see page 8).

Do not stare at the emitted light. It may be harmful to eyes.

The light of invisible wavelengths (such as ultraviolet or infrared) may be emitted depending on the illumination methods.

Liquid Light Guide



• **Do not use the liquid light guide that is not conformed to this product.**

You may get burned or your eyes may be damaged. For the liquid light guide that is conformed to this product, see page 14.

• **Do not remove the liquid light guide when the lamp is turned ON.**

The light emitted from U-LGPS may cause a fire. In addition, you may get burned or your eyes may be damaged.




Remove the liquid light guide after the liquid light guide and the LDP light source are fully cooled down.

Otherwise, you may get burned.

Software







If the application software (U-LGPS control software) that controls U-LGPS by connecting USB is hung up, set the power switch of U-LGPS to  (OFF).

The continuous emission from U-LGPS may not only damage the product but also may cause a fire.

Safety warning symbols

The following symbols are placed on the product.



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

Symbol	Meaning
	Indicates a non-specific general hazard. Follow the description given after this symbol or in the instruction manual.
	Indicates that the surface becomes hot. Do not touch with bare hands. You may get burned.
	Indicates that the seesaw type main switch is ON. (Seesaw type is the type of switch where ON or OFF is selected by pressing it to ON or OFF side.)
	Indicates that the seesaw type main switch is OFF.

If caution labels are dirty or peeled off, contact us for replacement or inquiries.

Label position and instruction

The labels are attached to the portions which require special cautions during use and operation. Be sure to follow these instructions.

Label	Label position	Instructions in instruction manual	Page
	Back of U-LGPS	Caution for electric safety and prevention of electric shock	4
	U-LGPS liquid light guide insertion port	High temperature	5

If caution labels are dirty or peeled off, contact us for replacement or inquiries.

Handling precautions

General

- NOTE** • This product is a precision instrument. Handle it with care and avoid subjecting it to a sudden or severe impact.
- The liquid light guide contains a solvent. This solvent is not highly toxic, but if the liquid light guide is damaged and the solvent comes into contact with your hands or eyes, wash it off thoroughly with water.
 - Avoid twisting the U-LGPS as much as possible to prevent damage. Also, do not pull it forcibly with a tension of 3 kg or more.
 - Never disassemble any part of this product. It could cause unexpected accidents or failure of the product.
 - Do not use the product in areas where it may be subjected to direct sunlight, high temperature and/or humidity, dust or vibrations.
 - Do not use or store this product in environments where it may be subjected to dust, strong electric field, strong magnetic field, gas corrosion (chlorine, acid, alkali, etc.) and in sudden environmental change.
 - **For systems attachable to this product, see page 8.**
The use of this product in combination with other systems not only creates the risk of abnormal operation but it also may damage the product.

TIP Before disposing of this product, be sure to follow the regulations and rules of your local government.

List of combinable systems

This section indicates systems that can be combined with this product.

System	Microscope frame	Standard	
		IEC62471-1	IEC60825-1 EN60825-1 JIS C6802 GB7247.1 FDA 21CFR Part 1040.10 and 1040.11
BX43	BX43F	Risk Group 3 (see page 5)	Laser Class 1 (see page 3)
BX53	BX53F		
	BX53F2		
BX63	BX63F		
CKX53	CKX53SF		
IX73	IX73P1F		
	IX73P2F		
IX83	IX83P1ZF		
	IX83P2ZF		
SZX10	SZX2-ZB10		
SZX16	SZX2-ZB16		
	SZX2-ZB16A		
SZX7	SZX-ZB7		
BX51WI	BX51WIF		
BX53M	BX53MRF-S		
	BX53MTRF-S		
BXFM	BXFM-F		
GX53	GX53F		
MVX 10	MVX-ZB10		
MX63	MX63-F		
	MX63L-F		
SpinSR10	IX83P2ZF		
APX100	APX100-SU frame		
	APX100-HCU frame		

CAUTION

The use of this product in combination with systems that are not listed in the table shown above cannot be guaranteed. If you wish to use this product in combination with systems that are not listed in this table, take measures under your responsibility so that the use of this product in combination with systems you will use complies with standards required in your local area.

Maintenance and Storage

Cleaning of each portion



- **Remove dust around the ventilation openings of the product with a vacuum-cleaner, etc.**

Using the dusty product continuously may result in a fire or failure of the product.

- **Do not spray the product with flammable gas. Do not use the product near the spray containing flammable gas.**

Fire may be caused.

NOTE

- **Do not use organic solvents because they may deteriorate the coated surface or plastic parts.**

TIP

- Clean the product periodically (every 100 hours as a guide).
- Wipe the product with a dry soft cloth. If the dirt cannot be removed by dry-wiping, moisten a soft cloth with diluted neutral detergent and wipe the dirty surface with it.
- Blow off the dust attached to the edge surface of the liquid light guide with clean air.

Cautions after use

TIP

- After using this product, set the main switch of U-LGPS to **○**(OFF), wait until U-LGPS is cooled down sufficiently, and keep it covered with a dust cover during storage.
- Do not store the product in the environment where the condensation is caused by moisture or humidity.

Lifetime

TIP

The lifetime of this product is as follows, if the product is used properly according to this instruction manual (except consumables)

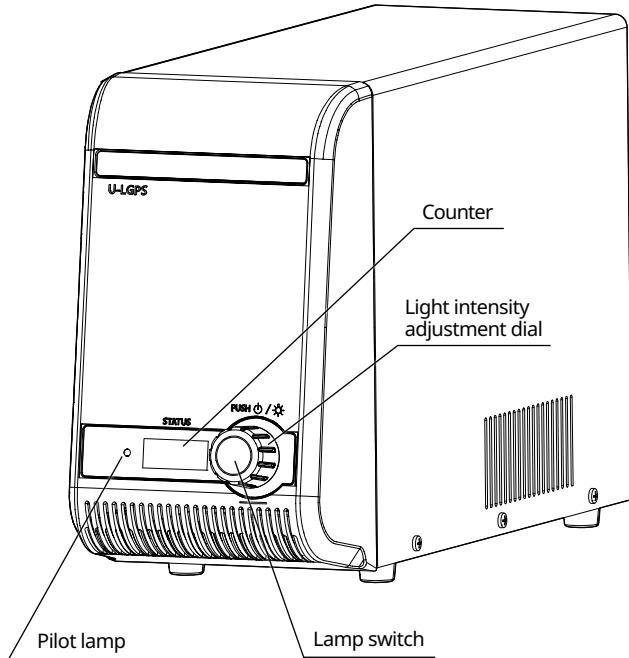
U-LGPS, U-LLGAD : 8 years after purchase

U-LLG150 / U-LLG300 : 3 years after purchase

1 Nomenclature of main operating portions

This section describes the nomenclature of main operating portions of U-LGPS, U-LLG150/U-LLG300 and U-LLGAD.

LED and LDP Light Source
U-LGPS

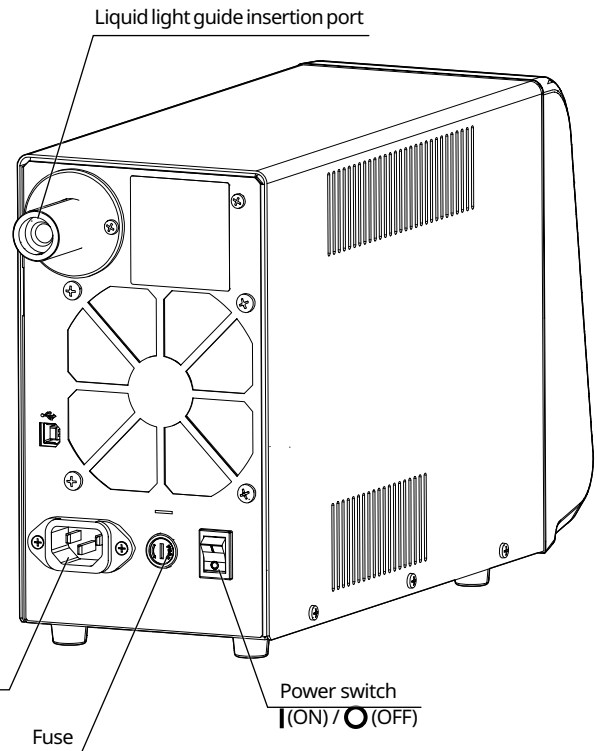


TIP

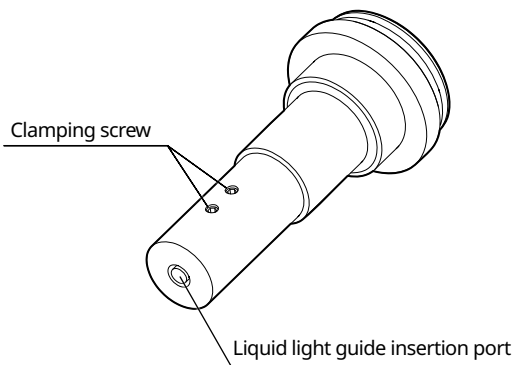
The color of the pilot lamp indicates the following status.

Pilot lamp	
Color	Status
Green	Standby
Blue	ON
Red	Error *

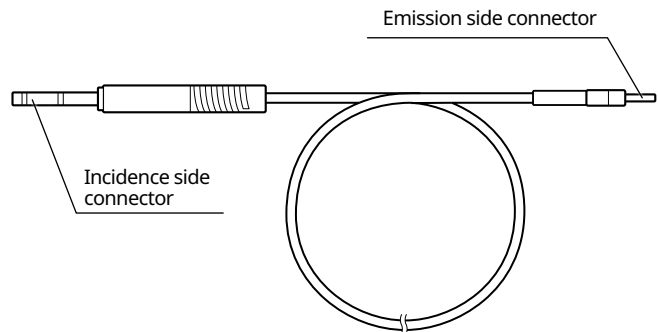
* For procedures to recover from the error, see page 12.



Liquid light guide adapter
U-LLGAD



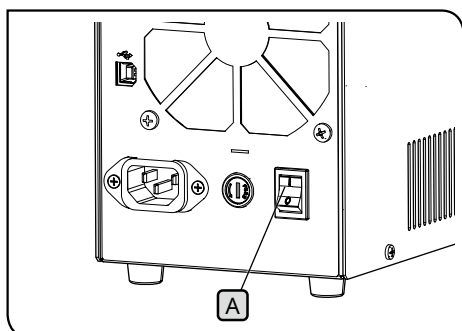
Liquid light guide
U-LLG150/U-LLG300



2 Operating Procedures

This section describes the basic operating procedures of each portion.

1 Turning ON the lamp

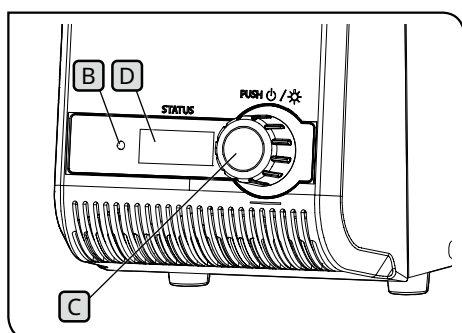


- 1 Set the main switch **A** on the back of U-LGPS to **I** (ON).

- TIP**
- The pilot lamp **B** on the front of U-LGPS turns ON (green).
 - The numeral characters or texts are displayed on the counter **D** on the front of U-LGPS.

When using U-LGPS control software:

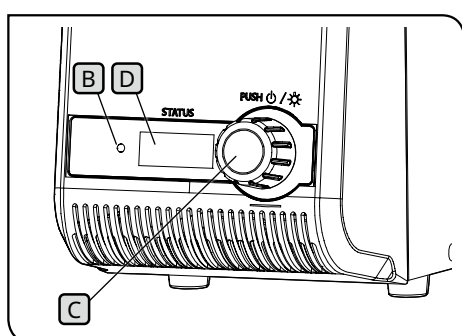
Turn ON the power of the PC (control PC) where software is installed, and start the U-LGPS control software.



- 2 Press the lamp switch **C** on the front of U-LGPS.

- TIP**
- The color of the pilot lamp **B** on the front of U-LGPS turns to blue.
 - Pressing the lamp switch **C** allows you to select ON or OFF of the lamp.
 - You can check the status of the lamp by the color of the pilot lamp. For details, see page 12.

2 Turning OFF the lamp

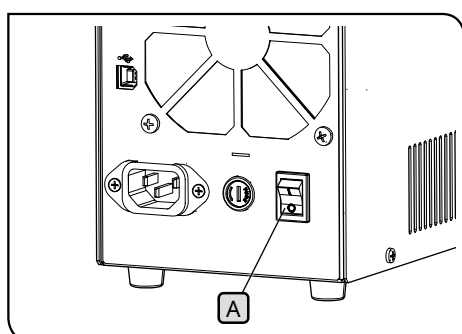


- 1 Press the lamp switch **C** of U-LGPS.

- TIP**
- The color of the pilot lamp **B** turns to green.
 - The cooling fan may keep working for cooling purpose. When the cooling is finished, the cooling fan stops automatically.

When using U-LGPS control software:

Turn OFF the power of the control PC.



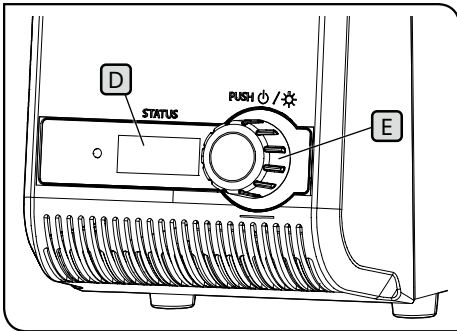
- 2 Set the power switch **A** to **O** (OFF).

- TIP**
- The pilot lamp **B** on the front of U-LGPS turns OFF.
 - The numeral characters or texts on the counter **D** on the front of U-LGPS disappear.

When using U-LGPS control software:

Turn OFF the power of the control PC.

3 Adjusting the brightness



1 Rotate the light intensity adjustment dial **E** to adjust the light intensity.

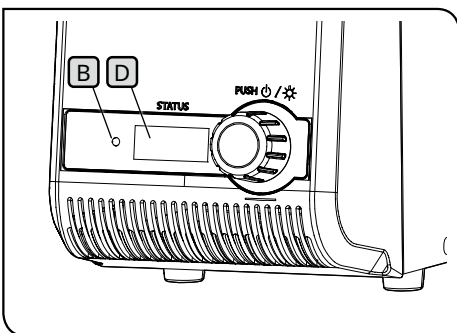
TIP

- Rotating the light intensity adjustment dial **E** allows you to change the numerical characters (Min: 010, Max: 100) on the counter **D** in increments of 5.
- The larger the numerical characters on the counter **D** become, the brighter the lamp becomes.

When using U-LGPS control software:

- You cannot adjust the light intensity using the light intensity adjustment dial **E**. Adjust the light intensity on the U-LGPS control software.

4 Pilot lamp color and counter display



The relation between the color of the pilot lamp **B** and the display on the counter **D** are listed as follows.

Pilot lamp B		Display on counter D	
Color	Status	Display	Description
Green	Lamp is OFF	010-100	Brightness of the lamp when the lamp is ON
Blue	Lamp is ON		
Red	Error in U-LGPS (Lamp turns OFF automatically)	c01-c23 *	Details of the error in U-LGPS

* The procedure to recover from the error is described below.

Display	Recovery procedure	Page
c06	Insert the liquid light guide into the liquid light guide insertion port of U-LGPS properly.	15
Other than c06	Set the power switch A to ○ (OFF), wait for a while and turn ON the lamp.	11

If you cannot recover from the error according to the above procedure, contact us for assistance.

When using U-LGPS control software:

The color of the pilot lamp **B** changes as the table shown above, and the display of the counter **D** always shows 000.

3 Troubleshooting

This section describes the possible problems of this product and their remedies.

If problems occur, please review the following list and take remedial action as needed.

If you cannot solve the problem after checking the entire list, contact us for assistance.

Phenomena	Cause	Remedy	Page
Even though the power switch is set to I (ON), the pilot lamp does not turn ON.	The power cord is not connected properly.	Connect the power cord properly.	16
	The power cord plug is not connected properly.	Connect the power cord plug properly.	16
	The fuse is blown out.	Replace the fuse with a new one.	17
The pilot lamp does not turn ON by pressing the lamp switch.	The power switch is set to O (OFF).	Set the power switch to I (ON).	11
The lamp is too bright.	-	Insert the optical element in the light path of the microscope frame to adjust the brightness. For details, refer to the instruction manual for the microscope frame you use.	-
The pilot lamp is blue, but the light from the lamp does not illuminate the sample.	The shutter is in the light path of the microscope frame.	Remove the shutter from the light path. For details, refer to the instruction manual for the microscope frame you use.	-
The lamp is too dark.	The liquid light guide is not attached to the U-LLGAD properly. Or U-LLGAD is not attached to the illuminator of the microscope frame properly.	Connect them properly.	15
The lamp does not turn ON.	The pilot lamp is green.	Press the lamp switch to make the pilot lamp blue.	12
The U-LGPS control software in use stopped.	-	Set the power switch to O (OFF). Then, turn ON the lamp.	11
The liquid light guide cannot be attached to U-LGPS or U-LLGAD.	The liquid light guide other than the conformable liquid light guide is used.	Use the conformable liquid light guide.	14

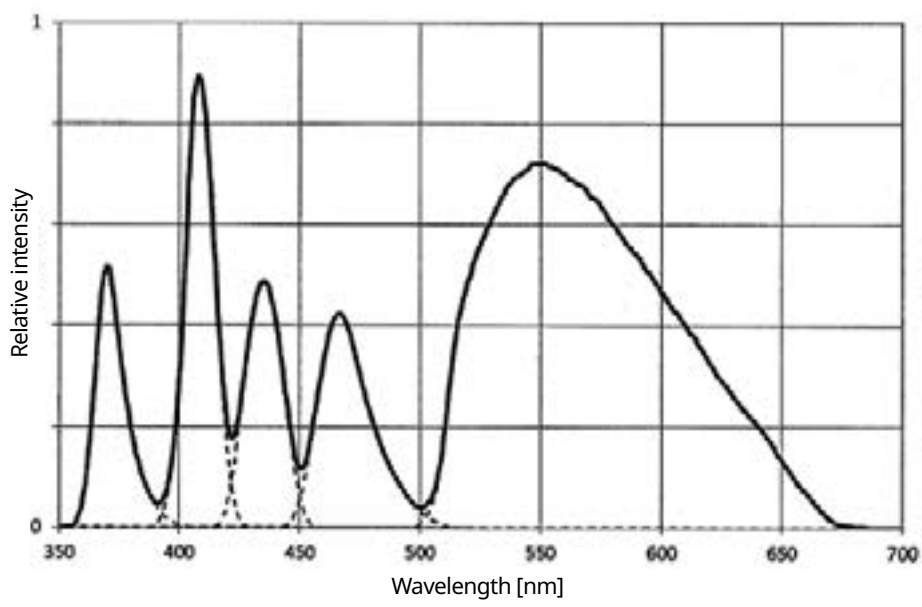
Repair request

If you cannot solve the problems even though taking actions described in Troubleshooting, please contact us for assistance. At that time, please tell them the following information as well.

- Product name and abbreviation (Example: U-LGPS)
- Serial Number
- Phenomena or strings displayed on the counter on the front of U-LGPS.

4 Specifications

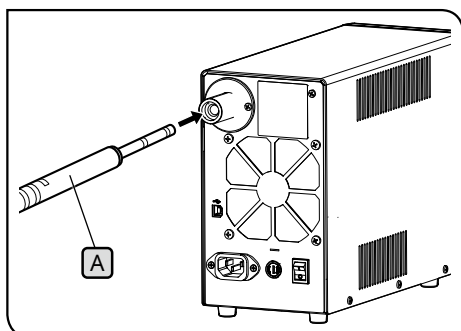
This section describes detail specifications, such as shape, functions and performances, etc. of this product.

Item	Specifications
Light emission type	LED, LDP (Laser Diode pumped Phosphor)
Wavelength range	360 to 665 nm
Peak wavelength	367, 407, 436, 470, 550 nm 
Power supply	AC 100-120 V / 220-240 V 50 Hz / 60 Hz
Power consumption	Power consumption 180 W or less Current consumption 2.2 A / 1.0 A
Response time	60 ms ※Condition specified by us
I/O connector	USB (B-type)
Dimension / Weight	120 (W) x 335 (D) x 214 (H) mm (excluding protrusions) 4.9 kg
Lifetime of light source	25,000 hours or more (nominal time) ※Condition specified by us
Conformable liquid light guide	U-LLG150, U-LLG300
Operating environment	<ul style="list-style-type: none"> Indoor use Altitude: Max. 2000 meters Ambient temperature: 5 to 40 °C (41 to 104 °F) Relative humidity: Max 80% (31 °C (88 °F) or less) (without condensation) In case of over 31 °C (88 °F), the relative humidity in operating environment is decreased linearly through 70% at 34 °C (93 °F), 60% at 37 °C (99 °F), and to 50% at 40 °C (104 °F). Supply voltage fluctuation: ±10 % Pollution degree 2 (in accordance with IEC60664-1) Installation/Overvoltage category: II (in accordance with IEC60664-1)
Transport / Storage environment	<ul style="list-style-type: none"> Ambient temperature: -20 to 70 °C (-4 to 158 °F) Relative humidity: 20 to 85% (without condensation)

5 Assembly

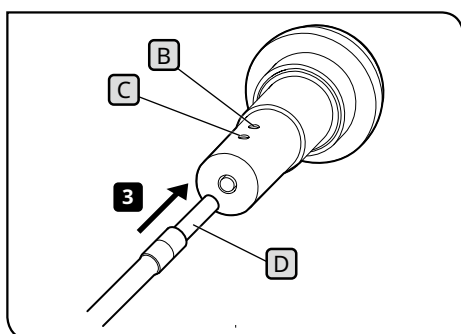
This section describes the procedures to assemble U-LLG150/U-LLG300 and power cords.

1 Attaching U-LLG150/U-LLG300



- 1 Hold the incidence side connector (A) of U-LLG150/U-LLG300 with hand, and insert it completely to the end of the liquid light guide insertion port of U-LGPS.

TIP When attaching U-LLG150/U-LLG300 to the APX100 system, it is not necessary to use U-LLGAD. For the following procedures, refer to the instruction manual for APX100.



- 2 Loosen the clamping screws (B, C) of U-LLGAD using the Allen screwdriver provided with the microscope.

TIP If the clamping screws (B, C) are not fully loosened, the tip of the emission side connector (D) contacts the clamping screws (B, C) and the emission side connector may not be inserted to the correct position.

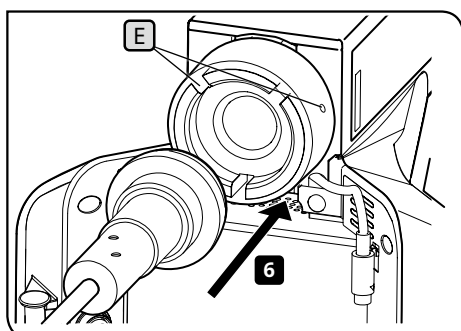
- 3 Insert the emission side connector (D) of U-LLG150/U-LLG300 completely to the end of the liquid light guide insertion port of U-LLGAD.

- 4 Tighten the clamping screws (B) firmly using the Allen screwdriver provided with the microscope.

TIP Pull the emission side connector (D) toward you to make sure that it does not come out.

- 5 Tighten the clamping screws (C) firmly using the Allen screwdriver provided with the microscope.

WARNING If the clamping screws (B, C) are not tightened firmly, U-LLG150/U-LLG300 may come off from U-LLGAD and a fire may be caused.



- 6 Attach U-LLGAD to the illuminator.

- 7 Tighten the clamping screw (E) of the illuminator using the Allen screwdriver provided with the microscope.

WARNING Do not turn ON the lamp while U-LGPS is not attached to the microscope using U-LLG150/U-LLG300 and U-LLGAD. The light from this lamp contains the UV light. Looking directly at the light may damage your eyes. Also, it could cause a fire.

NOTE U-LLG150/U-LLG300 and power cords are vulnerable to bending and twisting. Be careful not to apply excessive force.

2 Attaching the power cord

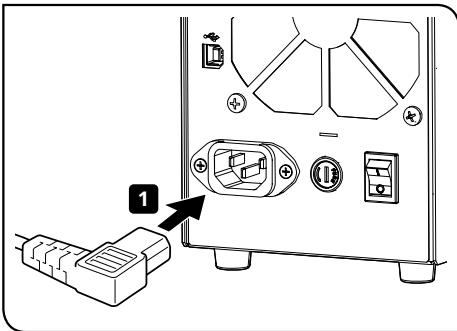
⚠ CAUTION

• Always use the power cord provided by us. If the proper power cord is not used, the electric safety and the EMC (Electromagnetic Compatibility) performance of the product cannot be assured. If no power cord is provided, please select the proper power cord by referring to the section "Proper selection of the power cord" at the end of this instruction manual.

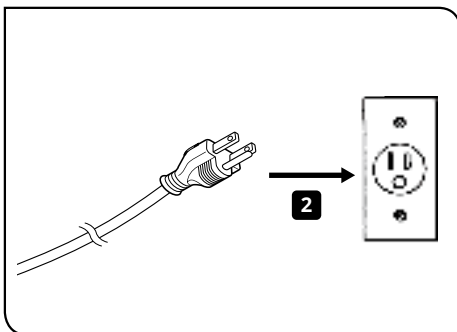
• Connect the power plug to the grounded 3-core outlet. If the outlet is not grounded, the electric safety performance intended by us cannot be assured.

NOTE

• Be careful not to apply excessive force to power cords.
• Be sure to set the main switch to **○(OFF)** before connecting the power cord.



1 Insert the power cord completely to the end of the connector on the back of U-LGPS.

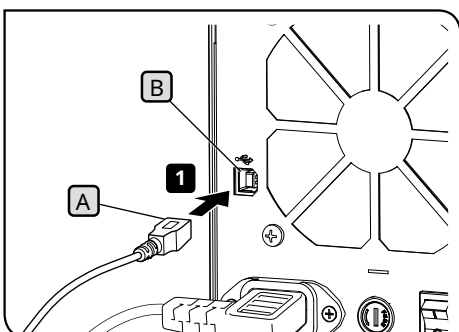


2 Insert the power cord plug completely to the end of the power outlet.

3 Connecting the USB cable

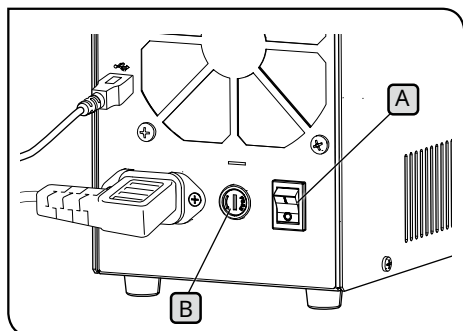
TIP

The USB cable is connected when using U-LGPS control software.



1 Insert the connector (B-type) **(A)** of the USB cable completely to the end of the connector **(B)** on the back of U-LGPS.

2 Insert the connector (A-type) of the USB cable completely to the end of the connector of the control PC.



4 Replacing the fuse

- 1 Set the power switch **A** of U-LGPS to **○**(OFF), and unplug the power cord plug from the outlet.
- 2 Rotate the fuse box **B** using the flat-blade screwdriver and remove it.
- 3 Replace the fuse in the fuse box with a new fuse.

[Applicable fuse]

T 3.15 A H 250 V (LITTELFUSE 02153.15MXP)

⚠ WARNING Using a non-specified fuse may cause a fire.

- 4 Return the fuse box to the original position, and rotate the fuse box **B** using the flat-blade screwdriver to secure it.

TIP

If the fuse is blown out frequently, contact us for assistance.

■ Proper selection of the power supply cord

If no power supply cord is provided, please select the proper power supply cord for the equipment by referring to “Specifications” and “Certified Cord” below:

Caution : In case you use a non-approved power supply cord for our products, we can no longer warrant the electrical safety of the equipment.

Specifications

Voltage rating	125 V AC (for 100-120 V AC area) or, 250 V AC (for 220-240 V AC area)
Current rating	6 A minimum
Temperature rating	60 °C minimum
Length	3.05 m maximum
Fittings configuration	Grounding type attachment plug cap. Opposite terminates in molded-on IEC configuration appliance coupling.

Table 1 Certified cord

A power supply cord should be certified by one of the agencies listed in Table 1 , or comprised of cordage marked with an agency marking per Table 1 or marked per Table 2. The fittings are to be marked with at least one of the agencies listed in Table 1. In case you are unable to buy locally the power supply cord which is approved by one of the agencies mentioned in Table 1, please use replacements approved by any other equivalent and authorized agencies in your country.




















Country	Agency	Certification mark	Country	Agency	Certification mark
Argentina	IRAM		Italy	IMQ	
Australia	SAA		Japan	JET	
Austria	ÖVE		Netherlands	KEMA	
Belgium	CEBEC		Norway	NEMKO	
Canada	CSA		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		United Kingdom	ASTA BSI	
Germany	VDE		USA	UL	
Ireland	NSAI				

Table 2 HAR flexible cord

Approval organizations and cordage harmonization marking methods

Approval organization	Printed or embossed harmonization marking (May be located on jacket or insulation of internal wiring)		Alternative marking utilizing black-red-yellow thread (Length of color section in mm)		
			Black	Red	Yellow
Comite Electrotechnique Belge (CEBEC)	CEBEC	<HAR>	10	30	10
Verband Deutscher Elektrotechniker (VDE) e.V. Prüfstelle	<VDE>	<HAR>	30	10	10
Union Technique de l'Electricite' (UTE)	USE	<HAR>	30	10	30
Instituto Italiano del Marchio di Qualita' (IMQ)	IEMMEQU	<HAR>	10	30	50
British Approvals Service for Electric Cables (BASEC)	BASEC	<HAR>	10	10	30
N.V. KEMA	KEMA-KEUR	<HAR>	10	30	30
SEMKO AB Svenska Elektriska Materielkontrollanstalter	SEMKO	<HAR>	10	10	50
Österreichischer Verband für Elektrotechnik (ÖVE)	<ÖVE>	<HAR>	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	<DEMKO>	<HAR>	30	10	30
National Standards Authority of Ireland (NSAI)	<NSAI>	<HAR>	30	30	50
Norges Elektriske Materielkontroll (NEMKO)	NEMKO	<HAR>	10	10	70
Asociacion Electrotecnica Y Electronica Espanola (AEE)	<UNED>	<HAR>	30	10	70
Hellenic Organization for Standardization (ELOT)	ELOT	<HAR>	30	30	70
Instituto Portages da Qualidade (IPQ)	np	<HAR>	10	10	90
Schweizerischer Elektro Technischer Verein (SEV)	SEV	<HAR>	10	30	90
Elektriska Inspektoratet	SETI	<HAR>	10	30	90

Underwriters Laboratories Inc. (UL)
Canadian Standards Association (CSA)

SV, SVT, SJ or SJT, 3 X 18AWG
SV, SVT, SJ or SJT, 3 X 18AWG

Manufactured by

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Industrial solutions

Service Center



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Official website



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