XD LIGHT

(Portable LED HeadLight System)

User Manual
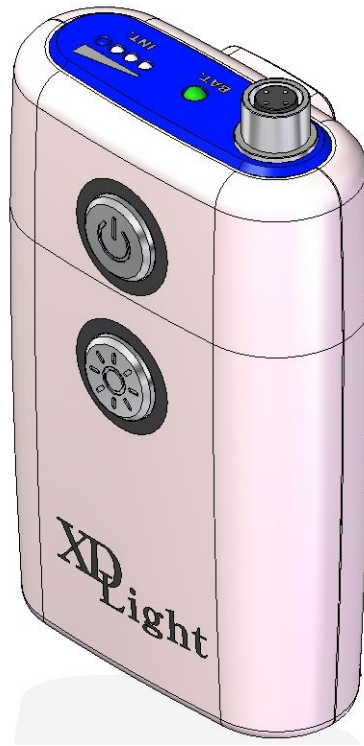
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INTRODUCTION

Portable LED Headlight System: XD Light is the medical device with lithium-ion battery and LED light source which is suitable for flashing on to watch the wound or surgery spot. As a portable device, it does not need supplementary holder and fiber optic cable. By the help of co-axial & shadow-free illumination, XD Light provides you the excellent color rendering with consistent brightness. This product is the medical device and KFDA approval & registration is described like below table.

Registration No.	1909	Certificate No.	Gyeongin Jesin 07-86
Product Category I	(A) General Instruments	Class	Class 1
Product Category II	A03000 Medical Light and Lamps	Product Category III	A03030.01 Operating Headlamp
Product Model No.	XD Light		
Manufacturer	Xenosys Co., Ltd.		
Country of Origin	Republic of Korea		

The external figure of product is like below pictures. Please refer to components on page 8~9.

Isometric View	Front View	Rear View
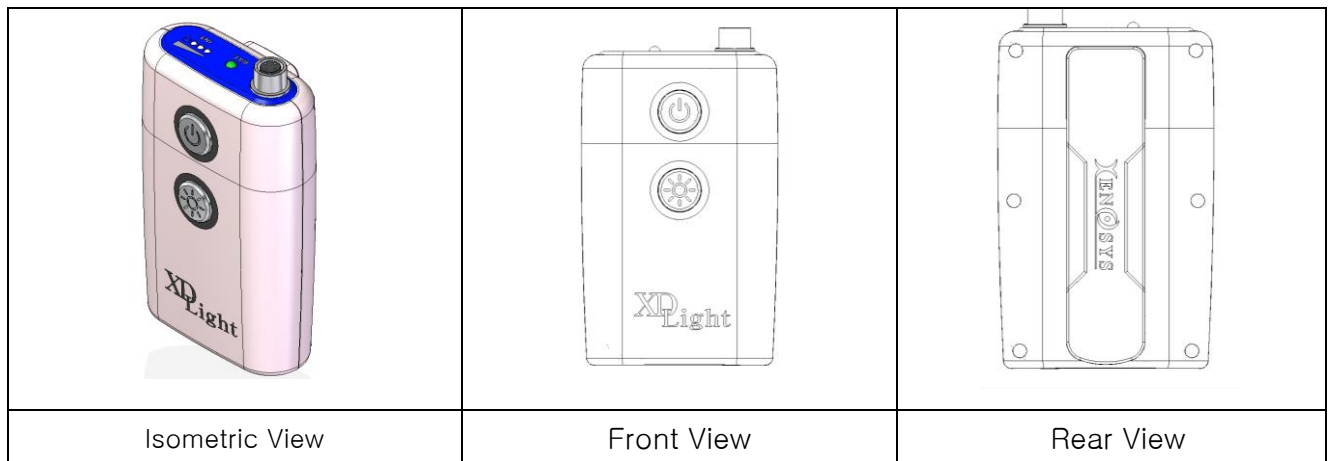
Model	Power	Spectrum	Lamp Type
XD Light	Portable Battery	Visible	LED

Table A: Features of XD Light (Portable LED Headlight System)

SAFETY & PRECAUTIONS

Before the usage, you should read the manual & precautions carefully and use it properly. You should follow next procedures and warnings about the battery & other components to prevent any fire, injury, or damage to human body.

⚠ WARNING for Safety:

1. Do not heat the product with microwave machine or oven.
2. Do not dispose the battery into a fire.
3. The product is not waterproof (Ordinary equipment, IPX0), so avoid the humidity and water.
4. Do not use in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide.

⚠ WARNING for Power Unit:

1. Do not use any undesignated charger by Xenosys. If any damage or unexpected hazard happens by the usage of undesignated charger, the manufacturer is free from the responsibility.
2. In case of any oil spillage or liquid to inside of the product may cause fire or electric shock. Then turn off the power immediately and disconnect the power cord.
3. Do not bend or twist the power cord excessively. It may cause fire or electric shock.
4. Do not touch the power cord with wet hand which may cause electric shock or equipment damage.
5. Do not use L2S15 with connecting directly to the battery pack during the operation or medical practice.

⚠ WARNING for Main Body:

1. Never disassemble or undertake modification of the equipment.

2. Do not use the main body while it's connected to medical power supply and charging.

3. Do not put any metal or flammable object into the main body. It may cause fire or electric shock.

4. Any drop or hard shock may cause the potential damage to the equipment.

5. Do not use or store the equipment in the area where get the direct ray of light, humidity, dust or soot.

6. Clean up with a dry and soft cloth.

7. Do not use the detergent or chemical fluid to clean which may cause discoloration.

8. Avoid the reach of children or pets.

9. Maintain the following conditions for storing the product.

Environment for Storage & Transportation	
Ambient Temperature	10℃ ~ 40℃ (50°F ~ 104°F)
Relative Humidity	30 ~ 85% @ 10℃ ~ 40℃ (50°F ~ 104°F)
Pressure	860 hPa ~ 1060 hPa

⚠ WARNING for LED Lens Module:

1. Do not drop, crush, or put a high pressure on LED lens module.

2. Clean LED lens surface with dipped alcohol or methanol in dry cloth softly.

3. Do not bend or twist the connection cable between the main body and LED lens module which may cause the defective.

4. LED optic outside emits heat, so be careful on touching.

5. Do not look directly into LED lens module or some one's eyes to avoid the risk of permanent eye damage

RISK GROUP 2

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

⚠ WARNING for Battery:

1. The battery is lithium-ion rechargeable one.

2. When transporting only battery, make sure to keep it in soft case. Do not make any conductor to connect the battery charging point.

3. The battery operating time may shorten using in the cold place (below (-10℃) even fully charged one. In that case, warm up the battery within the pocket before using L2S15. Do not heat up the battery with microwave or any heater.

4. Use only the charger which is provided by Xenosys.

5. Charger battery in the range of +10℃ ~ +35℃. It may take longer to charger the battery out of this temperature range.

6. Provided battery can be charged and discharged about 300 times at room temperature. Lithium-ion battery is expendables, thus if the operating time is shortened after full charge, we recommend exchanging new battery.

7. Be careful on benzene, thinner, alcohol (volatile & flammable fluid) and water. If those chemicals penetrate the battery, it may cause the trouble in circuit and any accident.

8. If there is any swollen battery, spill, emit, or fire, stop using immediately and contact the distributor (dealer) or the manufacturer.

9. Never use any damaged battery and charger.

10. In case of the first installation or unused long time, then charge the battery fully before using.

⚠ WARNING for Charger:

1. Do not connect any metallic objects between the cradle connector and battery. This may cause the defective on the charger and charger cradle.

2. Use only the charger which is provided by Xenosys on the phone jack. This may cause the defective on the charger and charger cradle.

⚠ WARNING for Disposal:

1. In case of careless disposal, it may pollute the environment, so make sure to separate collection.

FEATURES

1. Operating Principle

   XD Light adopts the way to deliver DC voltage from the battery to LED device through STEP-Down circuit and generate light speed through the lens. Even though battery voltage is reduced, XD Light allows LED to provide consistent brightness.

2. Electrical Rating

   1) Battery Pack (Imbedded): DC3.62V 2950mAh (Lithium Ion)

   2) Charger: Input-DC5V, 2000mA / Output-DC4.2V, 1500mA

   3) Medical power supply: Input-AC100~240V, 50~60Hz, 0.3A / Output-DC5V, 2000mA

3. Protection Classification & Type against Electric Short
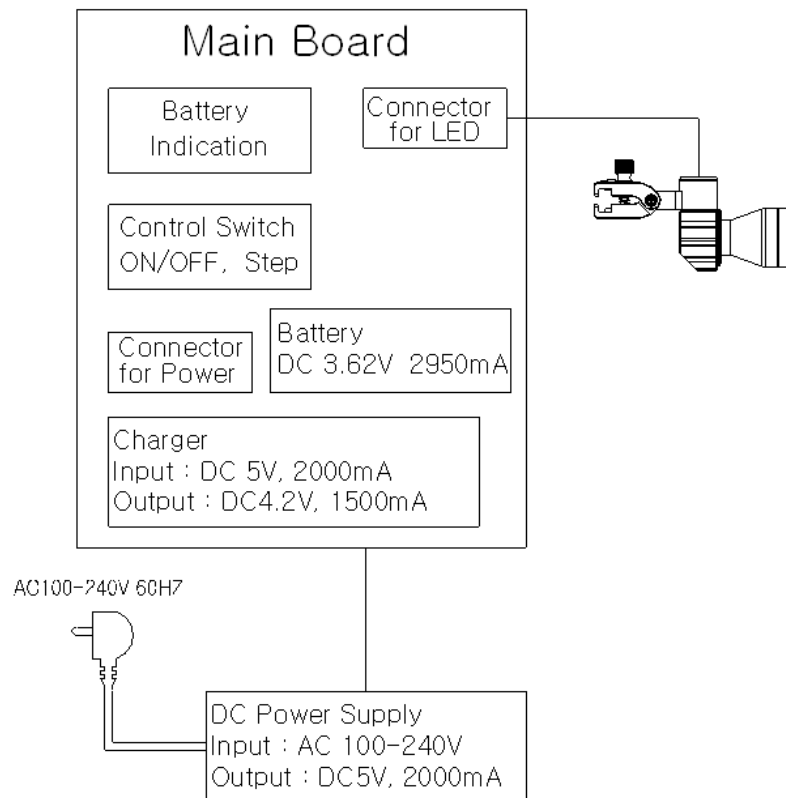
   1) Protection Classification: ① LED Control Unit: Battery Operated Equipment

   　　　　　　　　　　　　　　② Medical power supply: Class II device

   2) Protection: N/A

4. Safety Circuit: XD Light contains Latching Power Switch circuit and protection circuit for over current & overvoltage to keep the charging quantity.

5. Block Diagram: Refer to below figure.

COMPONENTS

1. Basic Components
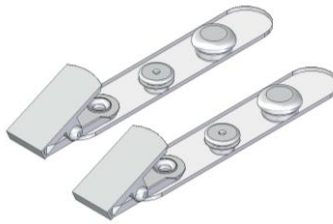

① Control Unit (DCU)

② LED Lens Module (DLM82)

③ Medical Power Supply
(BPM010S05)

④ Power Cord (LPC)

⑤ Gown Clip (GOC)

⑥ Screw driver, Universal Clip

2. Optional


⑦ Dental Anti-curing Filter
(For DLM82)

⑧ LED Lens Module (DLM150)

3. List of Components

No.	Components	Main Function & Description	Qty.	Reference
①	Control Unit (DCU)	Refer to page 9	1	
②	LED Lens Module (DLM82)	Refer to page 10	1	
③	Medical Power Supply (BPM010S05)	Refer to page 10	1	
④	Power Cord (LPC)	–	1	
⑤	Gown Clip (GOC)	–	1	
⑥	Screw driver, Universal Clip	–	1	
⑦	*Anti-curing Filter (LF0882)*	*Dental Anti-curing Filter (For DLM82)*	*1*	*Optional*
⑧	*LED Lens Module (DLM150)*	*Field of View: Ø150 mm @WD400mm*	*1*	*Optional*

FUNCTIONS

1. Control Unit (DCU)
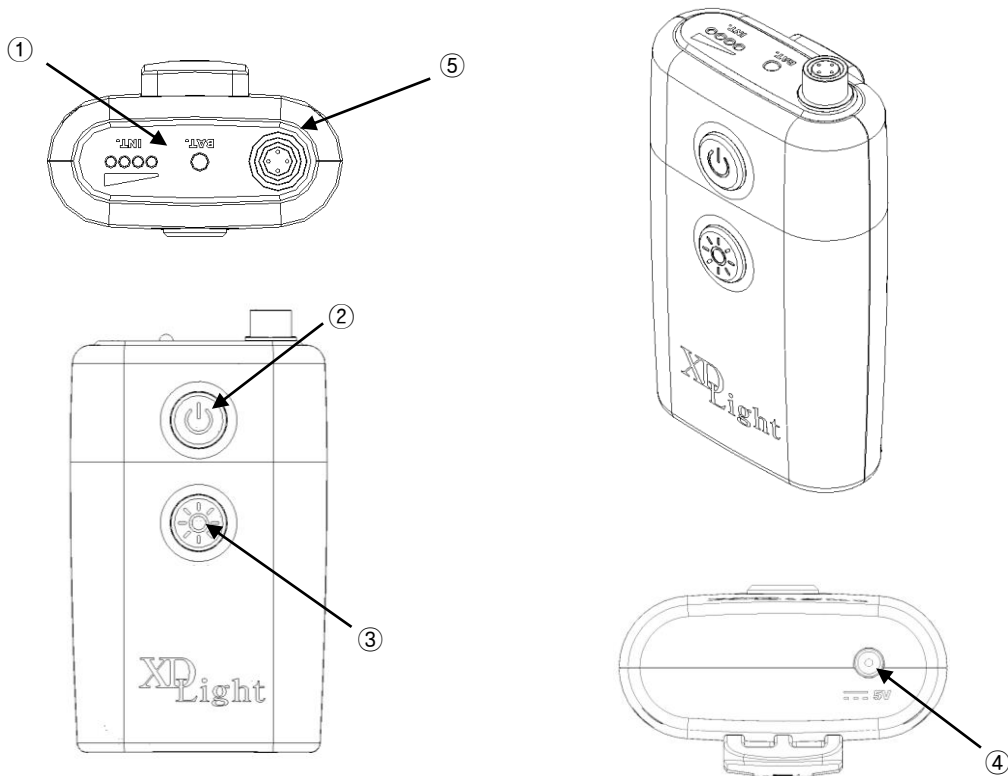
① Battery Remaining Signal: Show how much battery remains.
Example) Green->Orange->Blinking Orange.

Brightness Step Signal: Indicate from 1st step to 4th step

② Power ON/OFF button: Press the button to turn ON/OFF of LED lens module.

③ Intensity change button: To change the intensity of light from1 to 4.

④ Power input jack: To charge the battery input jack (DC5V/2000mA)

⑤ LED lens module connecting jack: To connect LED lens module (DLM82).

2. LED Lens Module (DLM82)
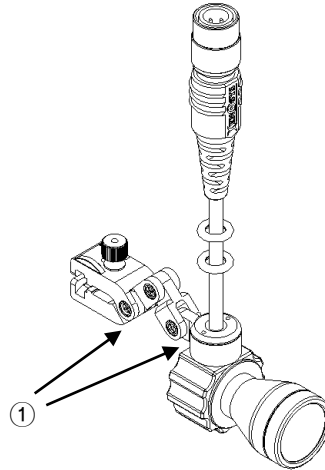
① Adjustable link: LED Lens module can move up-down, and left-right side.

⚠ Warning – Do not use non-Xenosys supplied power supply. This will cause severe damage to the cradle & main body which is also excluded from the under warranty.

3. Medical Power Supply

① Charging plug: To supply the power to DC5V connecting jack.

⚠ Warning – Do not use any other device randomly which may cause the defective reason. In case of using non-Xenosys-supplied charger with higher voltage (over 5V), it will cause the severe damage to main body. Please check if its Xenosys supplied charger and the serial

number. If it's Xenosys supplied one, then stop using and contact the distributor (dealer) or the manufacturer. If not, make sure to use Xenosys DC5V power supply.

OPERATING INSTRUCTION

A. Preparation before usage

1. Check components

   Components are shown on page 8~9. They can differ from the picture and replace or delete with new parts for better performance.

2. Charging battery & Assembling components

   The battery is not completely charged, so charge them fully before the first-time usage.

   ① Connect power supply & charger to supply the power.

   ② If the battery is fully charged, it will show green light on charger LED.

   ③ Assemble the control unit & fully charged battery, then connect LED lens module wire to the circular connector of the control unit.

B. Operating Instructions

1. Finish the preparation and put the main body to waist belt or inside of pocket.

2. When using headband, connect LED lens module to headband attachment and adjust to your head. When using surgical telescope, connect LED lens module to glasses nose bridge part.

3. Use gown clips to fix the wire and remove the protection cap of LED lens module.

4. Turn on the button of control unit to start the light operating and change the position of lens module to your own needs

5. Press the intensity change button either control unit or remote controller to match your own needs of light intensity.

   ⚠ WARNING – On turn-on LED, do not look directly into LED lens module or some one's eyes to avoid the risk of permanent eye damage.

C. Maintenance & Storage after use

1. If the usage is done, press the power ON/OFF button to turn off. Then store it to the case after cleaning dirt or bloods for further use.

2. Store LED light in the place free from the air with pressure, temperature, humidity, wind, ray of light, dirt, salinity, and ion.

3. Store L2S15 in the place free from the declination, shack, and shock.

4. Store L2S15 in the place free from gas, smoke, and chemical fluid.

5. Clean up & wash for next time use.

⚠ **Caution – External can be cleaned with soft cloth. In case of heavy pollution, try with a bit of neutral detergent and make sure to NO water or electrolyte flow into the main body.**

6. In case of malfunctioning, stop using immediately and contact the dealer.

7. Do not disassemble, repair, or modify the equipment by unauthorized personnel.

⚠ **Caution– Unauthorized disassemble, repair, or modification are out of warranty.**

9. Warning for storage of battery pack

As Li-ion battery is small-sized with high power, if it is stored fully charged condition for a long time, the battery lifespan can be reduced.
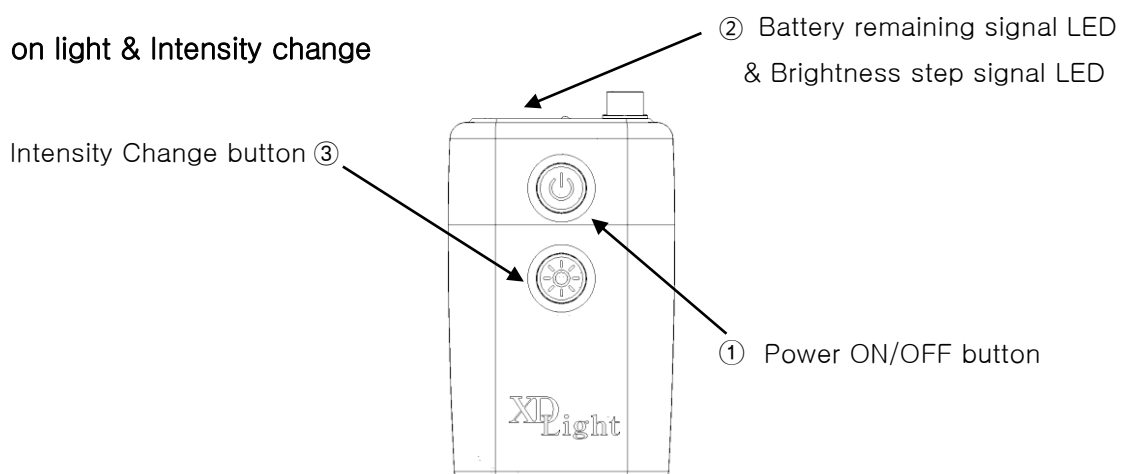
(1) Store it under half-charged condition in case of non-use immediately.

(2) Recommend to keep it in the dry condition with ambient temperature range of 6℃ ~ 40℃. Keep away from too hot or extremely cold places.

10. Battery Service Life

Provided battery can be charged and discharged about 300 times at room temperature. Lithium-ion battery is expendables, thus if the operating time is shortened after full charge, we recommend exchanging new battery.

D. Turn on light & Intensity change

② Battery remaining signal LED
& Brightness step signal LED

Intensity Change button ③

① Power ON/OFF button

1. Assemble the control unit & battery pack, then press power ON/OFF button to start.

    ① Check the light comes out from LED lens module.

    ② Check the battery remaining signal of control unit. (Battery remaining signal will be shown green, orange, blinking orange in turn.)

    ③ If fully-charged battery installed, it will show "Green". As battery will be exhausted, the remaining value will show "Orange". At 30% left battery, it will start to blink orange color. "Beep" alarm sound will come on less than 10%, and we recommend recharging the battery. After "Beep" sound, the power will shut down after 10 minutes.

    ⚠ Caution – Please recharge when hearing "beep" sound and only a few moments light come which means the battery is not charged.

2. Press the intensity change button to adjust desired brightness. ( )

    One press will apply to change one step each (STEP 1st, 2nd, 3rd, 4th).

    Below table will indicate LED lens module brightness (lx@WD400mm) & operating time.

Step	Brightness(lx) @WD400mm		Operating Time(hr)
	DLM82	DLM150	
1st	9,000	3,000	22
2nd	16,000	6,000	11
3rd	23,000	9,000	7.5
4th	29,000	11,400	5.5

3. Adjust LED lens module up-down or left-right to locate the desired position.

    ⚠ Caution – External LED lens module's temperature will go up to max. 46℃ during usage, so be careful.

4. After finishing the usage, press the power ON/OFF button to turn off.

E. LED Lens Module circular connector

1. How to connect: To connect LED lens module circular connector to control unit, make XENOSYS logo facing in front and connect to the phone jack of control unit.
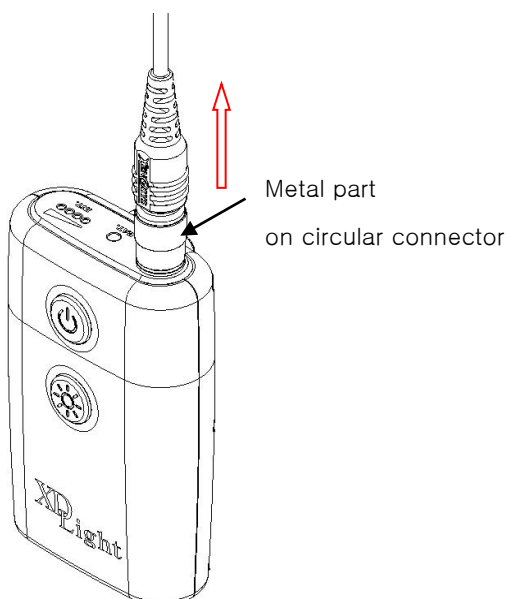
① Prepare to connect   ② After connected

XENOSYS Logo

Circular connector

Connector jack
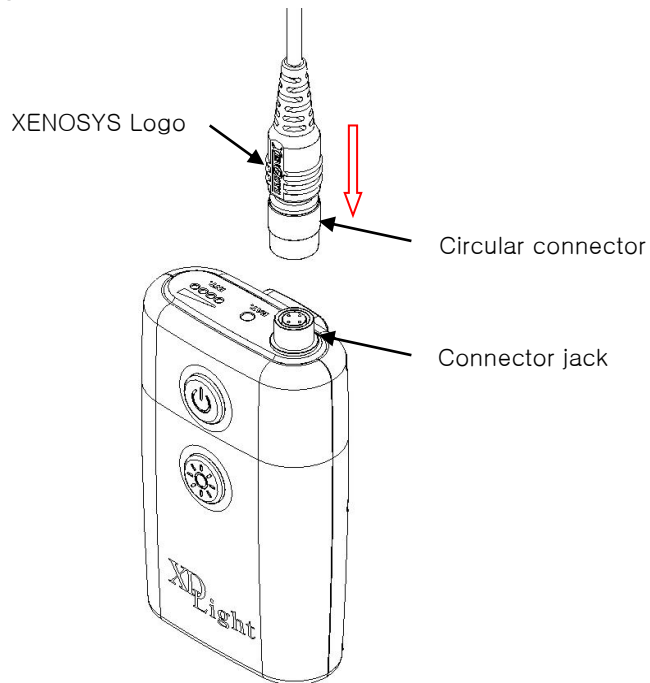
2. How to disconnect: Grab the metal part of LED lens module and release to the upward to disconnect.

① Prepare to disconnect   ② After disconnected

Metal part
on circular connector

F. LED Lens Module attachment examples

① Rigid Headband

③ TTL Loupe of Xenosys

③ Flip-up Loupe of Xenosys

④ Normal glasses

④ Protective goggle of Xenosys

BASIC TROUBLESHOOTING

Symptom	Check Point	Troubleshooting
No light comes from LED lens module	Check if the battery pack is properly installed.	Assemble the battery pack properly to charging terminal.
	Check if the cable connection is properly installed.	Connect properly again.
Light comes on a few moments and turn off	Check the battery remaining quantity	Recharge the battery
The light intensity is not enough	Check the intensity is properly adjusted.	Adjust the intensity step.
Discharging time is too fast	Check if the battery is fully charged. (Check the battery remaining LED)	If the battery running time Is too short even fully charged, we recommend exchanging with new battery as it is expendables.
LED lens is intermittently on & off	Check the wire near LED lens	Contact to local distributor or Xenosys

SPECIFICATIONS

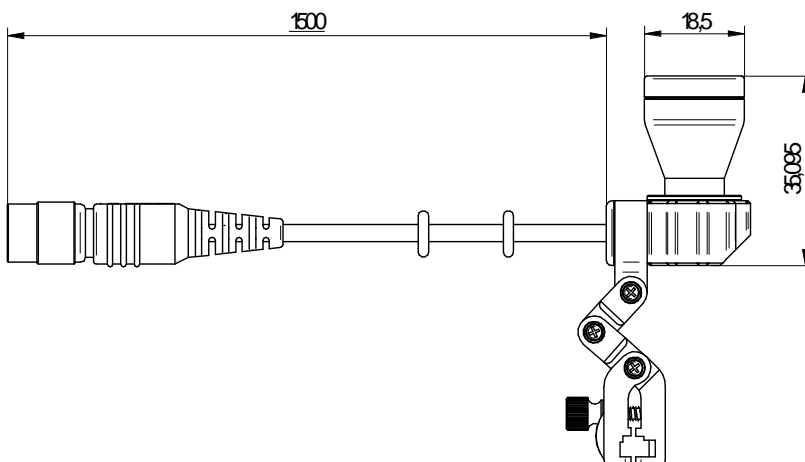1. Measurement & Weight

    A. Control Unit (DCU)

        ① Size: Refer to below photo
        ② Weight: 105 g
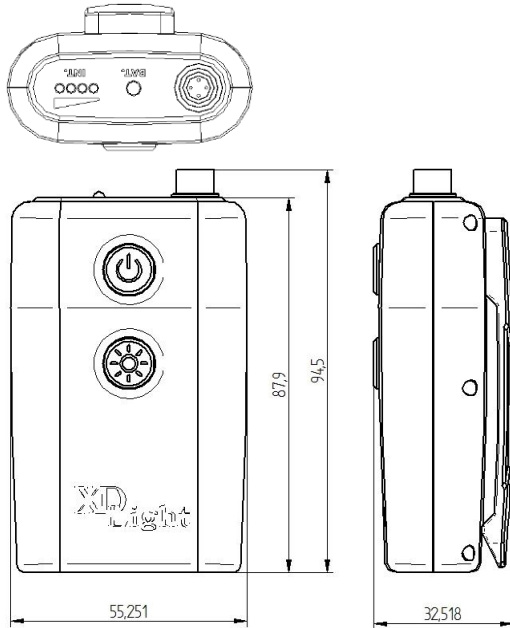
    B. LED Lens Module (DLM82)

        ① Size: Refer to below photo
        ② Weight: 57 g

C. Medical Power Supply (BPM010S05)

① Size: 95(L)x53(W)x33(H) [mm]
② Weight: 176 g

D. Power Cord (LPC)

① Measure: 1.8 m
② Weight: 90 g

2. Detail of Specification

Electrical Specification

Operating Power	▪ DC3.62V ▬ 550mA
Operating Time	▪ About 22 hours (1st step mode: Minimum), ▪ About 11 hours (2nd step mode), ▪ About 7.5 hours (3rd step mode) ▪ About 5.5 hours (4th step mode: Maximum)
Charging Time (Full charge)	▪ About 4 hours
Medical Power Supply	▪ Input: AC100~240V, 50-60Hz, 0.3A ▪ Output: DC5V ▬ 2A
Light Source	▪ High Power LED (White Color)
Imbedded Battery	▪ DC3.62V ▬ 2950mA Li-ion

LED Illumination

	Type	DLM82	DLM150
Brightness(lx)[±2000 lx] @ WD400mm	1st step	9,000	3,000
	2nd step	16,000	6,000
	3rd step	23,000	9,000
	4th step	29,000	11,400
Field of View (mm) @WD400mm		Ø82	Ø150
Weight (g)		57	52
Color Temperature, Wavelength Range		▪ 6000 K, 400 ~ 700 nm(Visible)	
Uniformity		▪ More than 80% @WD400mm	
LED Operating Power		▪ DC3.0 V ⎓ 500 mA	
LED Life Span (Guaranteed Time)		▪ 50,000 hours	

Package External Figures & Weight

External Figures	▪ W240 x H240 x D100 (mm)
Total Weight	▪ 1.3 kg

ELECTROMAGNETIC COMPATIBILITY

Electromagnetic Compatibility

It is designed to protect the medical equipment from the harmful interruption. This system occur electromagnetic interruption within the acceptable range. And, if it is not installed nor used properly to the direction, it may generate radio wave energy to cause any harmful interruption to some other equipment around. It cannot guarantee that the interruption will not give any influence to specific equipments. When the device is powered on, you can find out if it generates electromagnetic interruption or not.

Recommend to choose one and more ways to solve the trouble in the following ways.

1.   Relocate the equipments receiving the interruptive wavelength.

2.   Put the each equipment in longer distance.

3.   Connect the equipment to the different outlets from the ones connected to other

equipments.

4.	If you need expert's help, contact to manufacturer or professional distributor.


TRANSPORTATION

1. To protect XD Light from any damage in transportation, pack it by plastic bubble wrap or shipping box.

2. Load XD Light boxes up and down evenly by handcart and any vehicle trunk to transport.

3. When you carry XD Light by hand, hold it with two hands firmly and disconnect charger, and power cord from the main-body for safe transportation.

STORAGE

1. Maintain the following conditions for storing main products & components.

Environment for Operating & Storage	
Ambient Temperature	Ambient Temperature
Relative Humidity	Relative Humidity
Pressure	Pressure
Environment for Transportation & Storage (Non-operating)	
Ambient Temperature	Ambient Temperature
Relative Humidity	Relative Humidity
Pressure	Pressure

– External box marking will be as follows.

85 %   40℃   1060 hPa
30 %   10℃   860 hPa
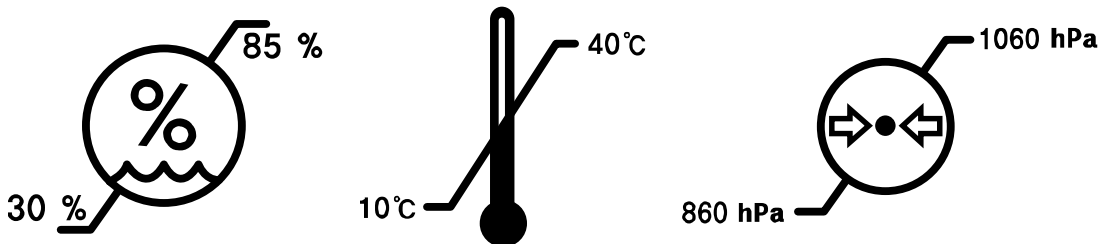
2. Do not pull out, twist, nor bend excessively the power cord.

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3. Wind up the power cord loosely, and store it by using the rubber bandage or cable tie.

4. Do not expose the main body to excessive shock, direct ray of light and high temperature which may cause the defective reason.

5. Caution for battery storage: As Li-ion battery is small-sized with high power, if it is stored fully charged condition for a long time, the battery lifespan can be reduced.

   ① Store it under half-charged condition in case of non-use immediately.

   ② Recommend to keep it in the dry condition with ambient temperature range of +15℃ ~ +25℃. Keep away from too hot or extremely cold places.

CLEANING INSTRUCTION

1. Clean up LED lens module surface by soft cloth with neutral detergent regularly to remove dirt, and leave it dry for usage.

2. Do not use volatile chemicals like benzene, alcohol, thinner, and acetone for cleaning. If there is any contact of these chemicals to the surface, clean it by soft cloth dipped with neutral detergent. However, the manufacturer is not responsible for any defect caused by these chemicals.

3. Do not expose the equipment to the sterilizing or cleaning process with excessive temperature and humidity. In case of the exposure, it will cause the damage to the equipment and out of warranty. Especially, inside parts of the main body do not allow the contact of any liquid.

SERVICE & WARRANTY

1. This service & warranty statement applies to all countries to the extent that there is no special warranty rule.

2. All services & warranty should be provided by Xenosys Co., Ltd. or authorized personnel by Xenosys Co., Ltd.

3. Warranty becomes effective from the sales date for material, production defective, or defect

under the normal use. Thus the warranty period starts from the first purchaser's sales date. Warranty will not be applied for abuse, improper use, negligence, improper installation, and operation or any remodeling, adjustment and modification by unauthorized personnel or technician. Refer to the warranty period in line #12.

4. Exchanged or any broken part after repair become to the property of Xenosys Co., Ltd.

5. There is no extended or renewed warranty period after the repair or replacement is done.

6. No warranty will be applied in case of the modification or personalized part by customer's request.

7. No warranty will be applied in case of no serial number or hard to detect the proper one.

8. Changes in this limited warranty require the previous approval from Xenosys Co., Ltd.

9. If there is any defect happens which cannot be handled by troubleshooting in this manual, return it to the manufacturer. Then Xenosys will take care of it. If the qualified engineer determines that the defect comes from the abuse or improper use, warranty will not be applied. The repair cost shall be notified prior to the service & repair work starts.

10. Before sending the equipment need for repair, contact the manufacturer or distributor. Then the manufacturer or distributor will report details with RMA No. and related reference which will make easier to track.

11. There are no user serviceable parts in this product. Please send the product to the distributor (dealer) for servicing. Technical description or manual is available upon request.

12. Warranty period of XD Light: 1 year (Only exception is for battery matter: 6 months)
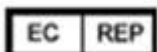
| EC | REP | EU Representative (EU Repräsentant)

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※ Revision List

Version No.	Release Date	Revision
Version 1.0	August 31, 2015	1st draft
Version 2.0	November 19, 2015	2nd draft