Doc. No.	F702M-L2SWE

L2SW

(Wireless LED Headlight System)

User Manual

Optical Device Medical Device System Engineering
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INTRODUCTION

Wireless LED Headlight System: L2SW is the medical device with lithium-Polymer battery and LED light source which is suitable for flashing on to watch the wound or surgery spot. As it is wireless can be attached to headband or glasses, it does not need long wires and fiber optic cable. By the help of co-axial & shadow-free illumination, L2SW 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.	L2SW		
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	Side View

Table A describes features of L2SW and detail specifications are described from page 17~19.

Model	Power	Spectrum	Lamp Type
L2SW	Portable Battery	Visible	LED

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 and LED Control Unit and battery pack 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 DC power supply except Xenosys. If any damage or unexpected hazard happens by the usage of undesignated DC power supply, the manufacturer is NOT responsible for any damage or collapse.
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.

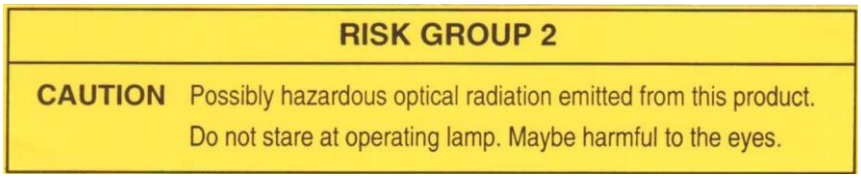
⚠ Warning for Main Body

1. Never disassemble or undertake modification of the equipment.
2. Do not put any metal or flammable object into the main body. It may cause fire or electric shock.
3. Any drop or hard shock may cause the potential damage to the equipment.
4. Do not use or store the equipment in the area where get the direct ray of light, humidity, dust or soot.
5. Clean up with a dry and soft cloth.
6. Do not use the detergent or chemical fluid to clean which may cause discoloration.
7. Avoid the reach of children or pets.
8. 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.



⚠ Warning for Battery Pack

1. The battery pack for L2SW is Lithium-Polymer 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 L2SW. 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 Charging

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

   L2SW 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, L2SW allows LED to provide consistent brightness.

2. Electrical Rating

   1) DC Power Supply: Input 100-240 V~ (50-60 Hz, 0.3 A), Output 5 V ⎓, 2.2A

   2) Charger: Input-DC5V, 2.2A / Output-DC4.2V, 1.0A

   3) Battery Pack (BTPWL): DC3.7V ⎓ 620mAh (Lithium Polymer)

   4) Battery Pack (BTPWS): DC3.7V ⎓ 380mAh (Lithium Polymer)

3. Protection Classification & Type against Electric Short

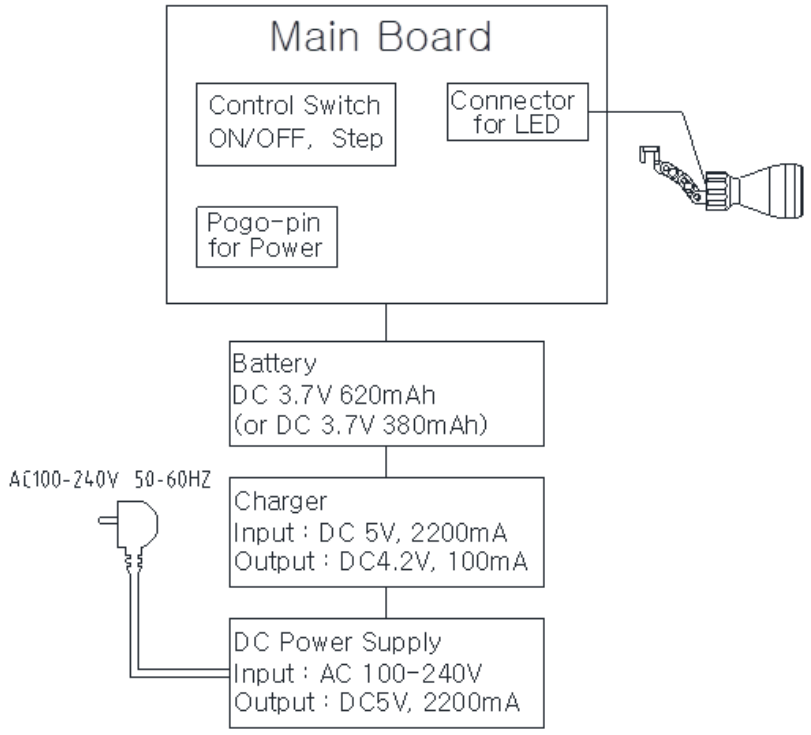
   1) Protection Classification: ① LED Control Unit: Battery Operated Equipment

   ② Medical power supply: Class II device

   2) Protection: N/A

4. Safety Circuit: L2SW 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 Main Body(LED Control Unit, LCUW)

② Battery Pack (BTPWL-2 pcs, BTPWS-2 pcs)

③ Charger (LCHW)

④ Medical DC Power Supply (FW8000MUSB05)

⑤ USB Power Cable (USBC)

⑥ KOIKO Mini Driver(DRV18)

⑦ L2SW Universal Clip (UGC02)

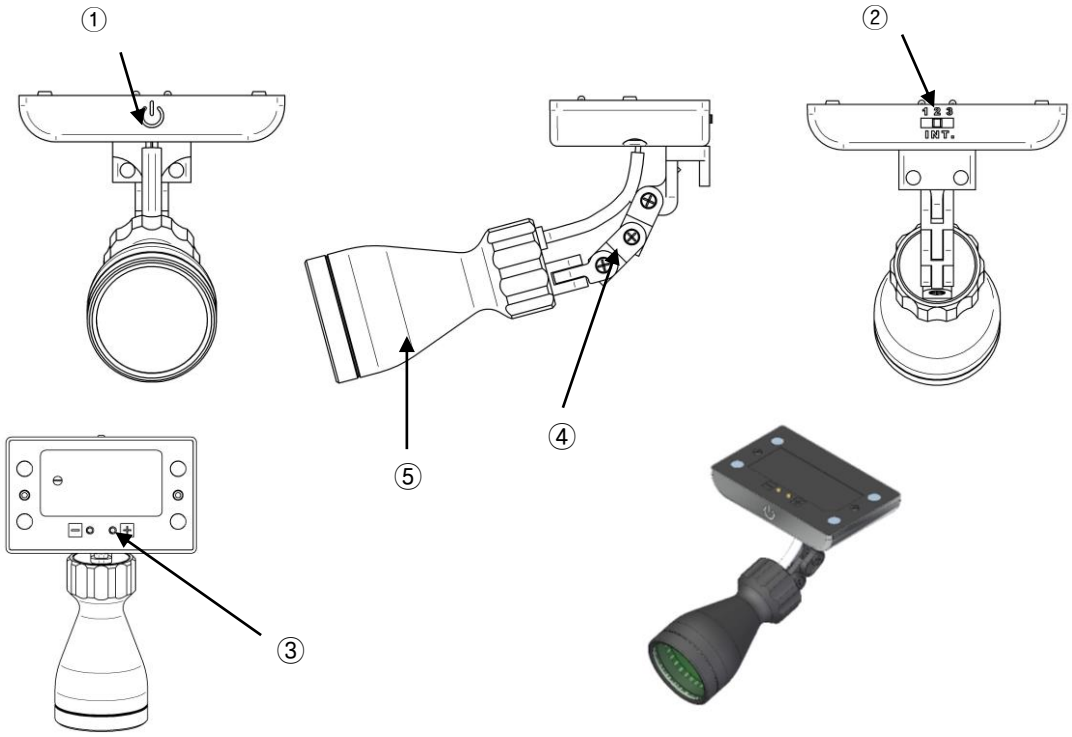
⑧ Anti-curing Filter (LF08-2)

3. Components List

No.	Components	Main Function & Description	Qty.	Reference
①	Main Body (LED Control Unit, LCUW)	Refer to page 9	1	
②	Battery Pack (BTPWL) Battery Pack (BTPWS)	Refer to page 10	2 2	
③	Charger (LCHW)	Refer to page 11	1	
④	Medical DC Power Supply (FW8000MUSB/05)	Refer to page 11	1	
⑤	USB Power Cable (USBC)	-	1	
⑥	KOIKO Mini Driver (DRV18)	-	1	
⑦	Universal Clip	-	1	
⑧	Anti-curing Filter (LF08-2)	Photo polymerization bond hardening prevention (Solely for LLMW)	1	

FUNCTIONS

1. Main Body (LED Control Unit, LCUW)



① Power ON/OFF: Operating with touch sensor and power ON/OFF for LED lens module.

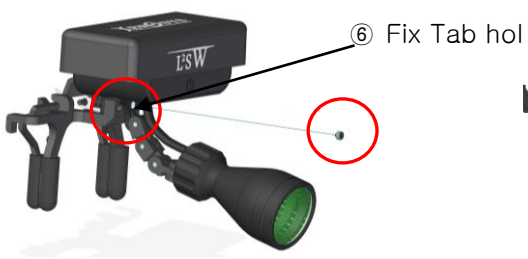
② Intensity Change Switch: Adjust the brightness intensity from 1 to 3 step.

③ Pogo Pin: Connect to battery output terminal.

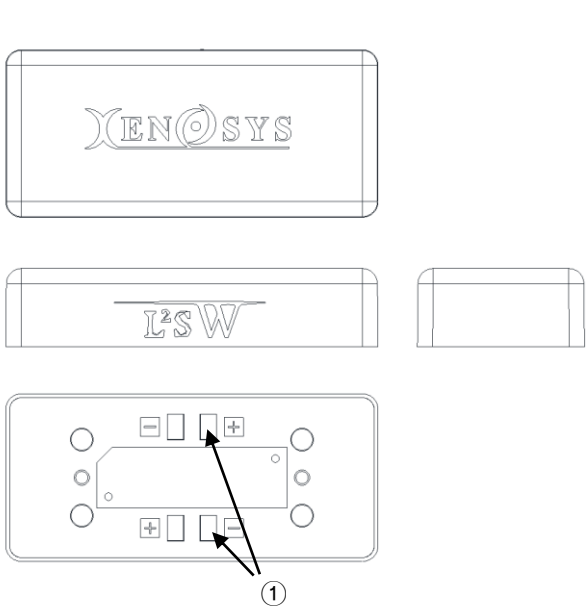
④ Adjustable link: LED Lens module can move up-down, and left-right side.

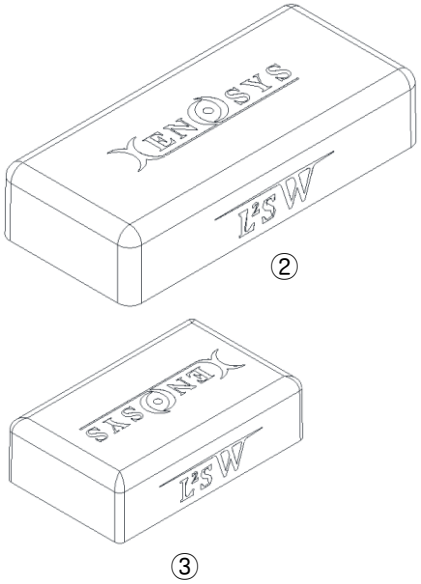
⑤ LED Lens Module (LLMW)

⑥ Fix Tab hole: Bolt position for universal clip or Xenosys TTL frame or loupe fix



2. Battery Pack



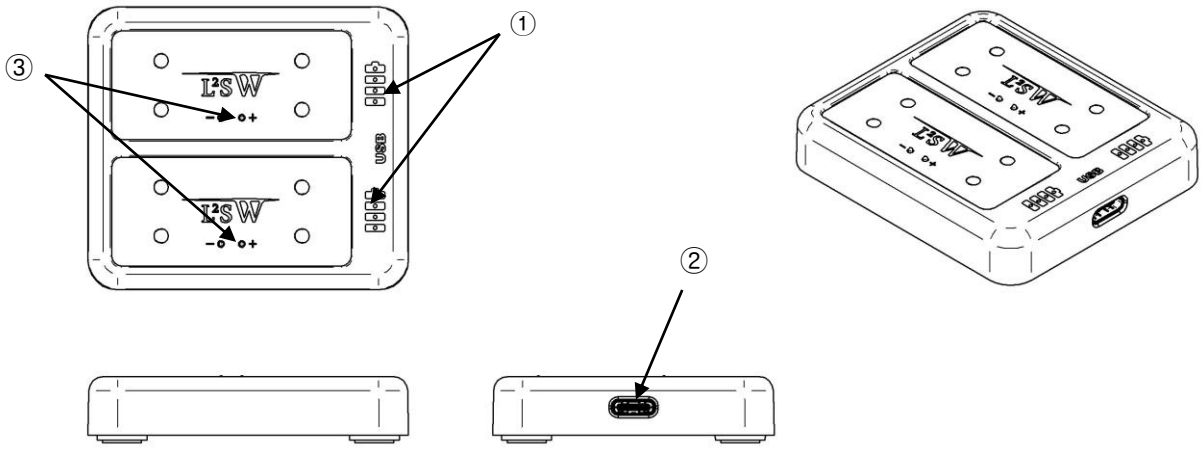


① Battery Output Terminal: Assemble to pogo pin of main body

② Battery Pack(Large Quantity, BTPWL): 3.7V / 620mAh Li-Polymer

③ Battery Pack(Standard, BTPWS): 3.7V / 380mAh Li-Polymer

3. Charger (LCHW)



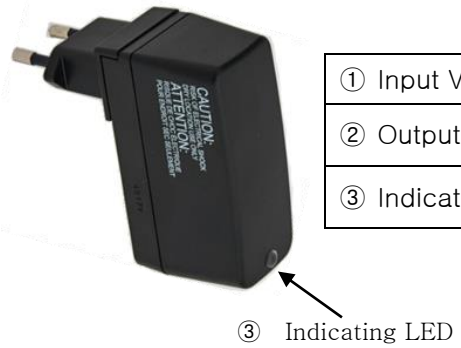
① Charging Status LED: There are total 4 LED indicators showing the charging status. (1: Less than 30%, 2: 30~60%, 3: 60~80%, 4 More than 80%)
If you connect DC5V power supply, charging status LED will blink, then you can check the charging status when the battery has been put on there.

② Power Connector Jack: Connector jack between DC5V power supply and the plug.

③ Charging Terminal: The charging will start when the battery has been put on the charger and connect DC5V power supply connected to the power plug.

⚠ 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.

1. Medical DC Power Supply (FW8000MUSB05)



① Input Voltage	100/240 VAC, 50/60 Hz, 0.3A
② Output Voltage	DC5V, 2.2A
③ Indicating LED	Green LED means normal power supply working

⚠ 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 INSTRUCITON

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 attach the main body to the universal clip or TTL frame (Note that the battery pack must be removed).
2. Assemble the desired battery pack to main body (Choose large(BTPWL) or standard(BTPWS))
3. Slightly touch Power ON/OFF button of main body from up to downward to turn on the LED and change the position of lens module to your own needs to up or down, left or right.
4. Adjust the intensity change switch 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 L2SW in the place free from the declination, shack, and shock.
4. Store L2SW 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-Polymer battery is small-sized with high power, if it is stored fully charged condition for a long time, the battery lifespan can be reduced.

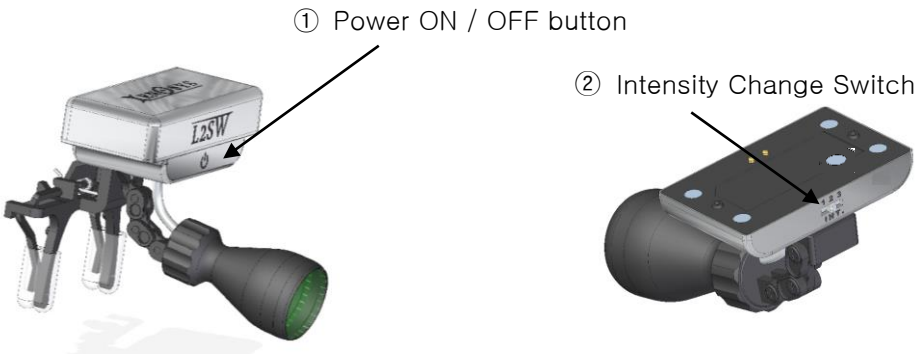
(1) Store it under half-charged condition in case of non-use immediately.

(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



1. Assemble LED control unit and battery pack, then slightly touch Power ON/OFF button to turn on.

   ① Check the light comes out from LED lens module.

   ⚠ Caution – Please recharge the battery when its turned on, but LED light comes off after short period of time.

2. Adjust the intensity change switch for desired brightness.

   Below table will show you the operating time & brightness (lx@WD400mm) according to each step.

LED Lens Module (LLMW)			
Step	Brightness (lx) @WD400mm	BTPWS Operating Time(hour/minutes)	BTPWL Operating Time(hour/minutes)
1st	4,800	5h 30m	8h 30m
2nd	10,000	2h 20m	3h 50m
3rd	15,000	1h 30m	2h 40m

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

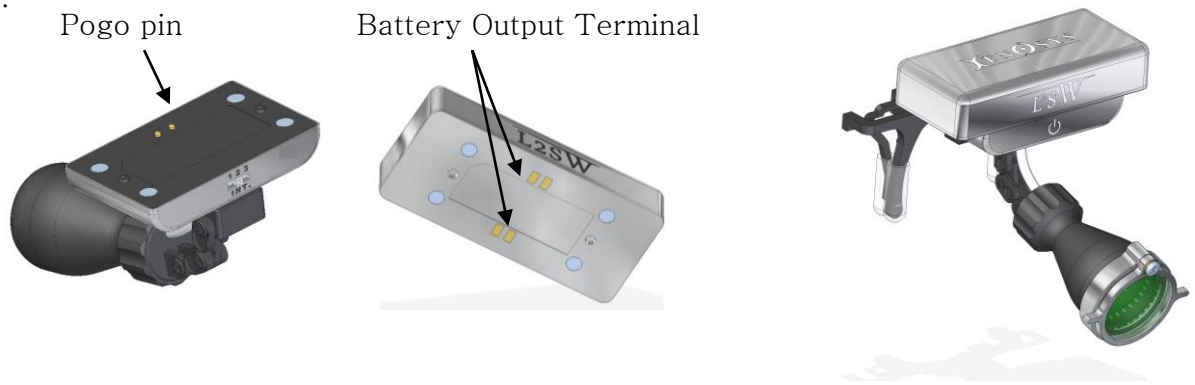
   ⚠ Caution – External LED lens module's temperature will go up to max. 46℃ during usage, so be careful.

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

E. How to disassemble the battery pack

1. Sit on the battery pack to fit pogo pin of main body to the battery output terminal of battery pack or disassemble the battery pack.

2.



F. Example of LED Control Unit attachment

① TTL frame

Attached to TTL Frame

Attached with
Universal Clip

BASIC TROUBLESHOOTING

Symptom	Check Point	Troubleshooting
No light comes from LED lens module	Check if battery is discharged	Charge the battery before use
	Check if LED lens wire is not broken	Contact to local distributor or Xenosys
Light comes on a few moments and turn off	Sit on battery to the charger to check remaining value	Re-charge 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 from charger)	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

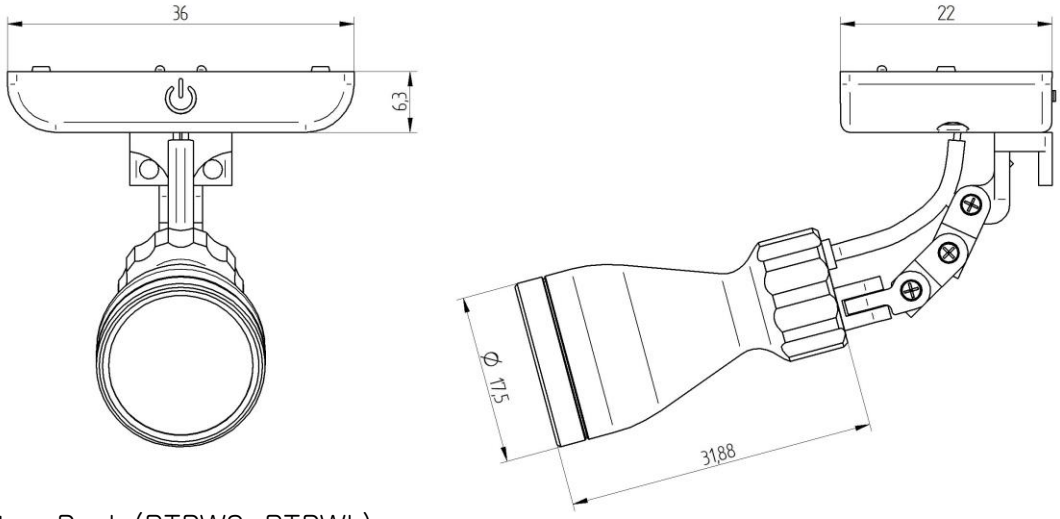
SPECIFICATIONS

1. Measurement & Weight

A. Main Body (LED Control Unit, LCUW)

① Size: Refer to below photo

② Weight: 15.1 g

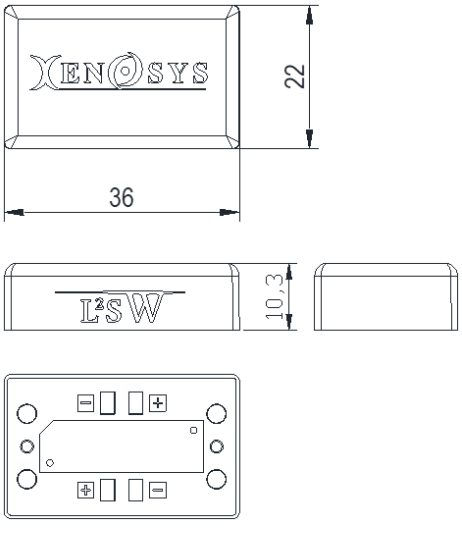


B. Battery Pack (BTPWS, BTPWL)

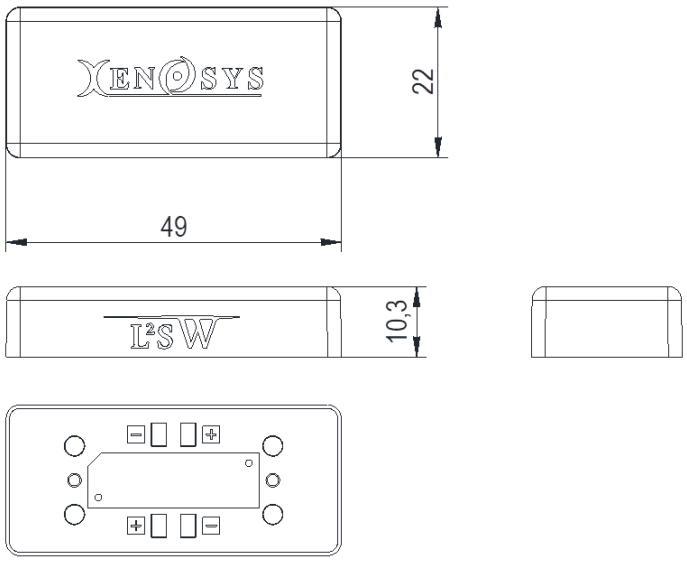
① Size: Refer to below photo

② Weight: BTPWS (11.4 g), BTPWL (16.4 g)

BTPWS



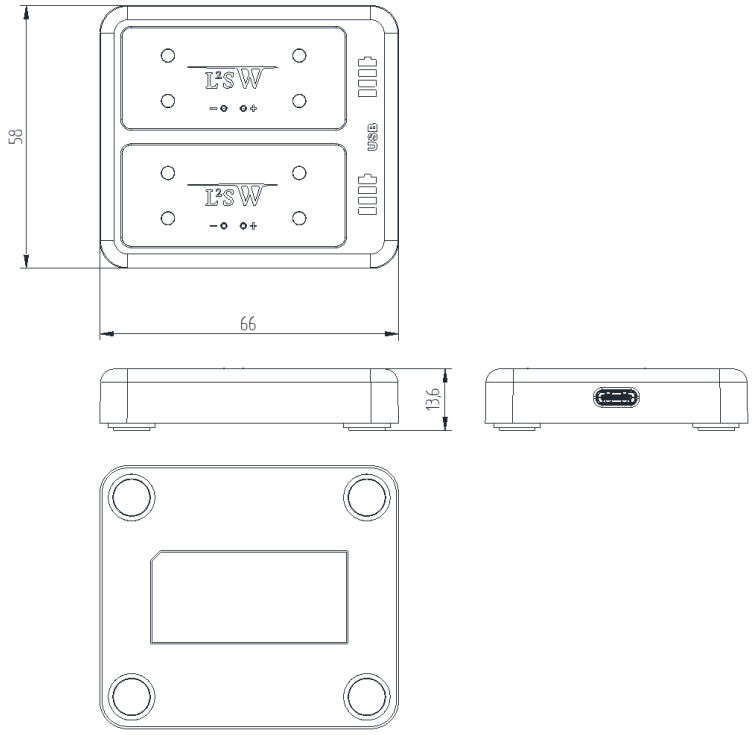
BTPWL



C. Charger (LCHW)

① Size: Refer to below photo

② Weight: 24 g

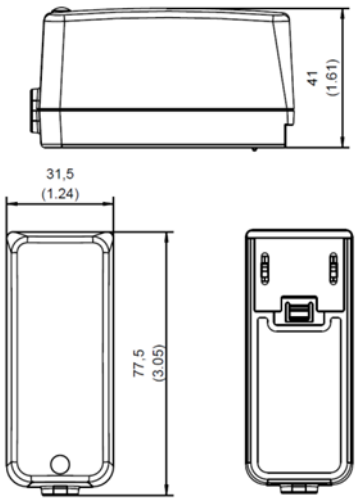


D. Medical DC Power Supply (FW8000MUSB/05)

① Size: 31(L)x41(W)x77(H) [mm]

② Weight: 81 g

The purpose of green LED is to indicate the power ON, regardless of charging status

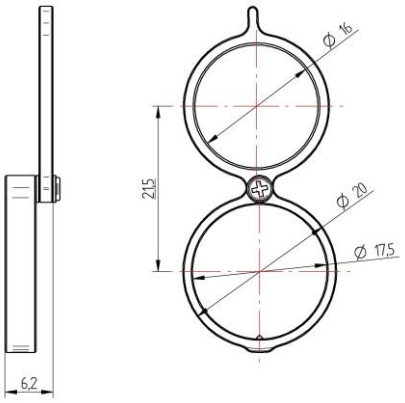


E. USB Power Cable (USBC)

① Size: 2m
② Weight: 44 g

F. Anti-curing Filter (LF08-2)

③ Size: Refer to below photo
④ Weight: g



2. Detail of Specification

A. Electrical Specification

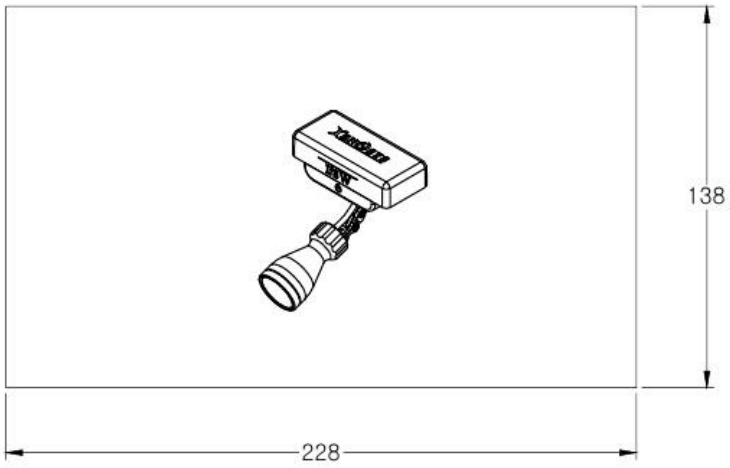
Medical DC Power Supply Operating Power	▪ Input: AC100-240V, 50-60Hz, 0.3A ▪ Output: DC5V ⎓ 2.2A
Charger Power	▪ Input: DC5V ⎓ 2.2A ▪ Output: DC4.2V ⎓ 1.0A
Battery Pack	▪ BTPWL : DC3.7V ⎓ 620mAh Li-polymer ▪ BTPWS : DC3.7V ⎓ 380mAh Li-polymer
Operating Time (BTPWS)	▪ Approx. 5 hours 30 minutes (1st step mode: Minimum Intensity), ▪ Approx. 2 hours 20 minutes (2nd step mode), ▪ Approx. 1 hours 30 minutes (3rd step mode: Maximum Intensity))
Operating Time (BTPWL)	▪ Approx. 8 hours 30 minutes (1st step mode: Minimum Intensity), ▪ Approx. 3 hours 50 minutes (2nd step mode), ▪ Approx. 2 hours 40 minutes (3rd step mode: Maximum Intensity))
Full Charging Time (BTPWS)	▪ Approx. 1 hours 50 minutes
Full Charging Time (BTPWL)	▪ Approx. 2 hours 40 minutes
Light Source	▪ High Power LED (White Color)

B. LED Illumination

Brightness(lx)[±2000 lx] @ WD400mm	Type	LLMW
	1st step	4,800
	2nd step	10,000
	3rd step	15,000
Field of View (mm) @WD400mm		Ø 82mm
Color Temperature, Wavelength Range		▪ 6000 K, 400 ~ 700 nm(Visible)
Uniformity		▪ More than 80% @WD400mm
LED Life Span (Guaranteed Time)		▪ 50,000 hours

C. Package External Figures & Weight

External Figures	▪ W228 x H138 x D80 (mm)
Total Weight	▪ kg



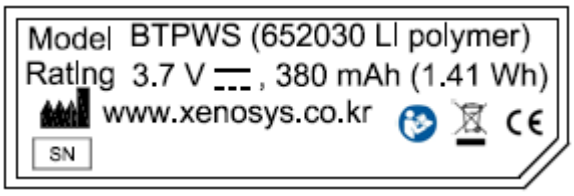
3. Labels

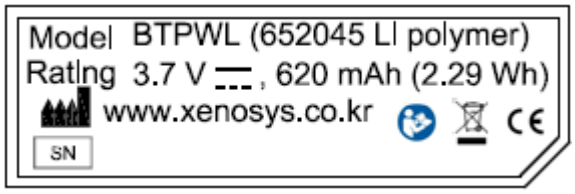
A. Outer Carton Box

Product	Medical Head Lamp	Model	L2SW
Rating	3.7 V ⎓, 350 mA	SN	mark on the inner box
Weight	kg		
Quantity	1 set	EC REP	Cormedics Medizintechnik GmbH Bahnhofstr. 32 82041 Deisenhofen, Germany TEL. +49 (0)89 666 58 79 15 Fax. +49 (0)89 54 999 030
	XENOSYS CO., LTD 2, Venture-ro 100beon-gil, Yeonsu-gu, Incheon 22013, Korea TEL. +82-32-875-9811		
The medical device			

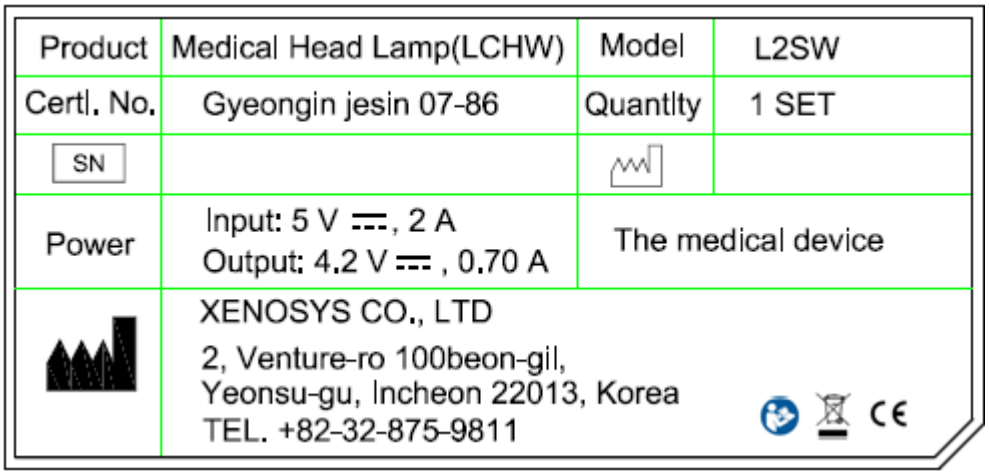
B. LED Control Unit

C. Battery Pack





D. Charger



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

TRANSPORTATION

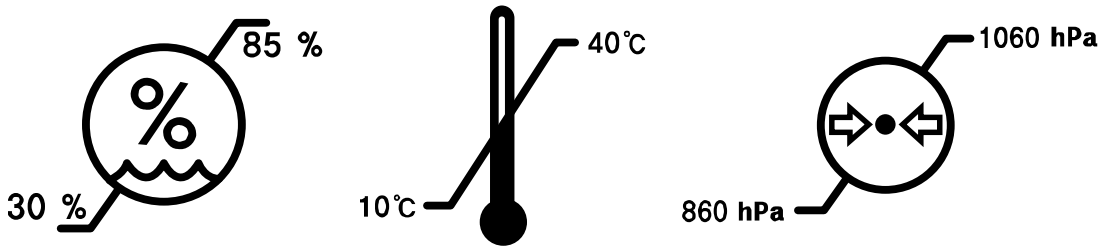
1. To protect L2SW from any damage in transportation, pack it by plastic bubble wrap or shipping box.
2. Load L2SW boxes up and down evenly by handcart and any vehicle trunk to transport.
3. When you carry L2SW by hand, hold it with two hands firmly and disconnect charger, and power cord from the main-body 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.



2. Do not pull out, twist, nor bend excessively the power cable.
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-Polymer 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 from 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.

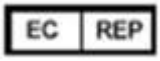
8. Changes in this limited warranty require the previous approval from Xenosys Co., Ltd.

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 L2SW: 1 year (Only exception is for battery pack: 6 months)



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※ Revision List

Version No.	Release Date	Revison
Version 1.0	March 12, 2020	First version

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