North-Southern Electronics

MEDICAL LED HEADLIGHT

User Manual(A/3)

Read this First

This User Manual contains safety and operation information about NSE Medical LED Headlight. Please keep the manual carefully to make it available when needed. Use the product accord with the operation instructions to achieve its best performance.

Pay attention to following information before using the device:

- Read all operation instructions, warnings, cautions and safety information at first.
- Place the manual in handy place in order to keep it for reference at any time.

Check the spare parts provided

When first time open the package, please check the describing spare parts are complete and in good condition. If any spare part is incomplete or damaged, please contact with your supplier.

Medical LED headlight of the main parts as follows:

Medical LED headlight	1pcs
Battery	2pcs
User Manual	1pcs
AC-DC Adapter	1PCS
Recharging Socket（just apply to EL-P/S/T series）	1pcs
LED On/Off Button Cap (apply to EL-Q series only)	2 PCS

∗ Note: the above parts and quantity according to the products of different specifications may change, specific please refer to our packing in the packing list.

⚠ Note: please keep the original packaging material, so that products can be reused, at the time of shipment.

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1 Product Overview

1.1 Series and Model

The product Medical LED Headlight includes four series according to different technical parameters and connection methods, as shown in Table 1.

Table 1 Product Series & Model Instruction

Series	Model（A type）	Model（B type）
EL-Q	EL-Q40、EL-Q40+	None
EL-P	EL-P35	None
	EL-P45	None
EL-S	EL-S50100	EL-S50100B
EL-T	EL-T4585	None

∗ “EL” indicates the Medical LED Headlight, while the letters “Q”, “P”, “S” and “T” stands for different series. The LED lamp connection method between A type and B type is different, which can be referred to Figure 2.

1.2 Intended Use

This product is intended to provide professional lighting for medical, which is apply to outpatient examination, ward-rounds and surgical treatment.

⚠ CAUTION: Do not stare at the lamp or aim the lamp at patient's eye in use.

1.3 Contraindications

No contraindication(s).

1.4 Product Feature

★ Optical System
Aspheric optical design and nano-processing can improve the utilization of light energy significantly, and with the precise light-averaging system the product outputs more bright and uniform spot with clear boundary. The sophisticated lights path design significantly realizes no-shielding excellent coaxial and achieves even smaller lamp housing diameter.

★ Positioning Mechanism
The flexible housing connector is made of special material, which leads to fully adjustable light beam direction. This structure makes operation more simple and convenient, and it can maintain good performance after lots of adjustments.

★ Circuit System
The low-power intelligent constant-current control based on SMPS technology realizes super-long working time, and the brightness maintains constant without any decline caused by low battery power. The auxiliary circuits of battery power monitoring, grading illumination adjustment and overheating protection can effectively increase the lifetime of battery and LED.

★ General Structure
With the ingenious and compact wireless design, all wires are completely embedded into the ultra-thin headband. The precise and lightweight crucial parts and unique high strength materials make the product even portable.

2 Safety Information

2.1 Description of Marks

CAUTION!	A CAUTION label applies to information that may cause safety hazard or damage to the product if neglected.
NOTE!	A NOTE label applies to important information for user without potential damage or risk.
	Caution.
	Refer to the instruction manual/booklet.
	Refer to operating instructions.
	Symbol for the marking of electrical and electronic equipment. The symbol indicating separate collection for electrical and electronic equipment.
	Can be recycling use.
	Keep away from sources of fire.
CE	CE mark.
	Battery indicator (just apply to EL-P/S/T series)
	Brightness indicator. To identify the brightness control.
	Class II equipment. (On ac adapter) To identify equipment meeting the safety requirements specified for Class II equipment according to IEC 60536.
	For in door use only

2.2 Safety Information

1. Power Supply	Be powered by an internal electrical power source
2. Protection against electric shock	Type B applied part
3. Protection against harmful ingress of water or particulate matter	IPX0
4. Suitability for use in an oxygen rich environment	Not AP or APG equipment
5. Mode of operation	Continuous operation
6. Rated voltage and current of system	DC 3.7V /Max 1A
7. For defibrillation-proof applied part	Not applicable
8. Any signal output/input part	None
9. Permanently installed or not	Not permanently installed

2.3 Safety Precaution

⚠CAUTION:

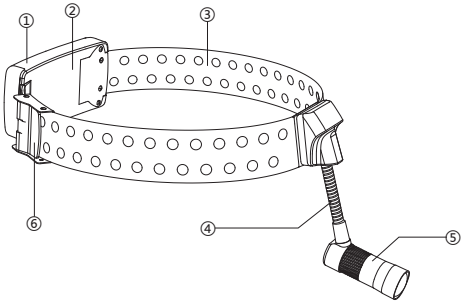
1. There is no circuit protection in this device. The output of the adapter is not allowed to be accessible to patient.
2. Do not stare at the lamp or aim the lamp at patient's eye when headlight is in use. It could be harmful to eyes.
3. Do not expose the battery in the ambient temperature above 60℃.
4. Avoid dropping when use the product, caution hot housing if the headlight works continuously over an hour.
5. Never attempt to disassemble the products or the accessories. If product failure or abnormal, should immediately stop using it and contact the supplier or manufacturer.

⚠ NOTE:

1. Use the original charger only with recommended charging methods in acceptable surroundings.
2. Modification of this equipment is not permitted.

3 Structure and Component

3.1 Product Structure



① Rechargeable Battery	④ LED Housing Connector*
② Control Panel	⑤ LED Housing
③ Headband	⑥ Headband Buckle

Figure 1 Medical LED Headlight Structure

∗The connector is diverse between different series product, which can be referred to Figure 2. Please check the product to get more details. The Figure 1 is shown just for introduce.

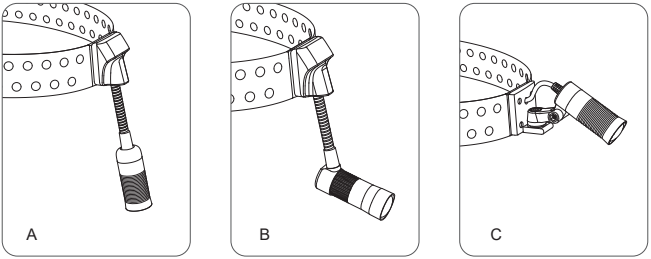


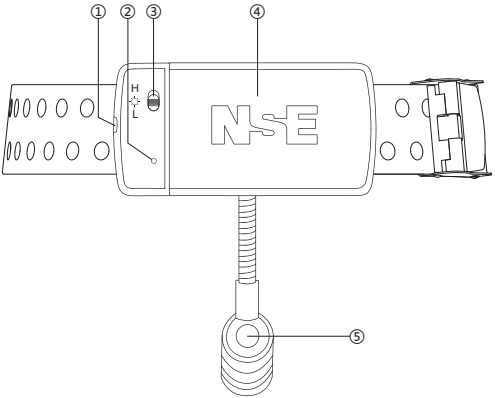
Figure 2 Three Kinds of LED Housing Connector

∗ A: Flexible pipe connector which is coaxial with LED housing;

∗ B: Flexible pipe connector which is non-coaxial with LED housing;

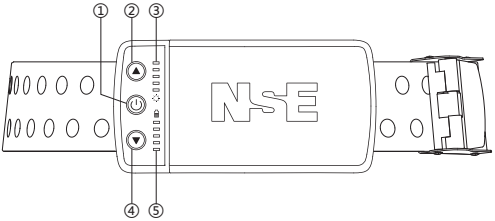
∗ C: Rotation shaft connector.

3.2 Control Panel



① AC Adaptor Hole	④ Battery Socket (with a battery in figure)
② Charging Indicator	⑤ LED On/Off Button
③ Brightness- adjustment Switch	

Figure 3 Control Panel for EL-Q series



① LED On/Off Button	④ Brightness Decrease Button
② Brightness Increase Button	⑤ Battery Indicator
③ Brightness Indicator	

Figure 4 Control Panel for EL-P/S/T series

★Replace LED On/Off Button Cap（Apply to EL-Q series only）

1. Take off broken button cap: Hold the broken cap between the fingers and pull it out with a little strength.
2. Install a new one: Take out a new cap and pinch it into the installation place.

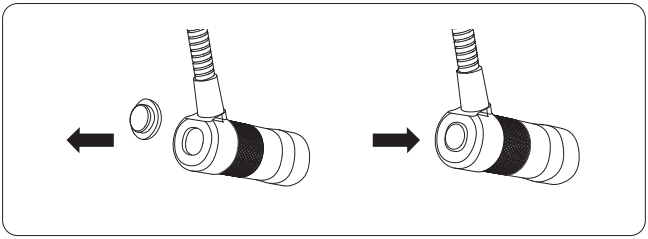


Figure 5 Replace Button Cap

4 Operation

4.1 Install Battery

Take out battery from packing box, then put it in battery socket besides control panel, finally push it inward until it is firmly in place. See Figure as below shown.

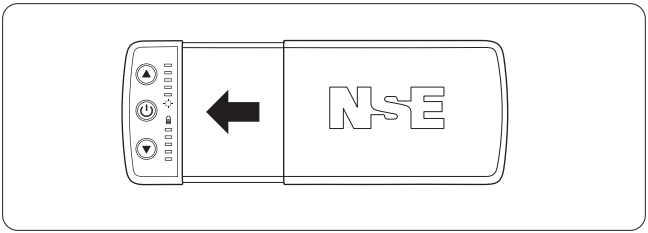


Figure6 Battery Installation

⚠NOTE: Using the battery designated by the manufacturer (NSE).

4.2 Wear Product

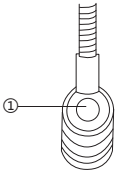
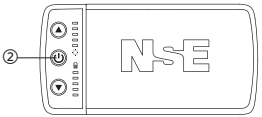
1. Wearing: Loosen headband buckle and pull the headband to suitable for head size, then wear the product on head.
2. Adjusting headband: Adjust the headband to match the head size and then close the buckle.

⚠ NOTE: Notice product direction should make the letters “NSE” stand.

4.3 Turn On LED Power

- Press the LED On/Off button on the control panel for 2 seconds turn on/ off LED power.
- The position LED On/Off button of EL-Q series distinguished from EL-P/S/T series, show as Table 2.

Table 2 Position of LED On/Off button for EL-Q and EL-P/S/T Series

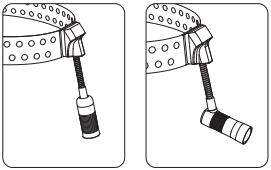
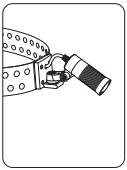
EL-Q Series	EL-P/S/T Series
	

① LED On/Off button ② LED On/Off button

4.4 Adjust LED Light Direction

Lamp irradiation angle can be adjusted according to requirements in working, the adjustment method is different between the models of A type and B type. The specific operation method can be referred to Table 3.

Table 3 Adjust Lamp Irradiation Angle

Models of A Type	Models of B Type
	
Hold the LED housing and adjust light direction by bending the flexible pipe connector.	Hold the LED housing and adjust light direction by movement of rotation shaft connector.

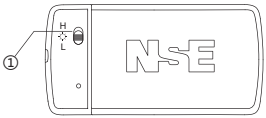
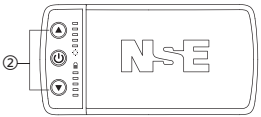
⚠ CAUTION:

1. The product may be damaged if LED housing is adjusted overly.
2. Caution the rising temperature of LED housing when the device was used for a long time.

4.5 Adjust Brightness Level

Brightness level can be adjusted with requirement in use, the adjustment method is different between EL-Q series and EL-P/S/T series. The specific operation method can be referred to Table 4.

Figure 4 Remove Binocular Loupes

EL-Q Series	EL-P/S/T Series
 ① Brightness- adjustment Switch	 ② Brightness- adjustment Buttons
Pull the switch upward to “H” side (high level) to make the headlight work in high luminance, otherwise pull the switch downward to “L” side (low level) to get low luminance during LED lamp power on.	Press the button to increase brightness level and brightness indicator will light up one more, while press the button to decrease brightness level and the indicator will go out one more during the LED lamp power on.

⚠NOTE: Power consumption rises with the increase of brightness level. Usually 3rd brightness level or below is recommended to achieve longer working time.

⚠CAUTION: Avoid staring at LED lamp or aiming it to patient’s eye when LED power on.

4.6 Replace Battery

Remove low-capacity battery: Press the empty battery and push it outward with a little strength, operate as shown by Figure 7 (left one and middle one). Install additional spare battery: Put spare battery into the socket besides control panel and push it until it is firmly in place, operate as shown by Figure 7 (right one).

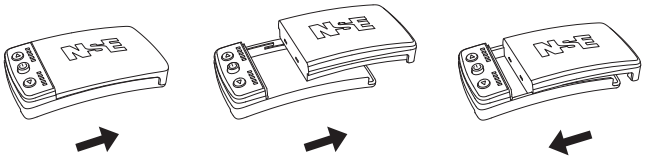


Figure 7 Replace Battery

⚠NOTE:

1. Make sure the LED is in OFF state before battery replacement and installation.
2. Make sure the AC adapter is disconnected with power supply before you need install or remove the battery from recharging socket of EL-P/S/T series.

⚠CAUTION: Please use original accessories.

4.7 Recharge Battery

Recharging the battery is necessary when its capacity is not enough. Battery remaining capacity will reduce with working time, in low battery station, the internal buzzer (for EL-Q series) or LED lamp's flashing (for EL-P/T/S series) will remind user recharging. Check

★Table 5 for further instructions.

Table 5 Low Battery Indication and recharge battery

EL-Q series	EL-P/S/T series
★ Buzzer Alarm When the battery power is not enough, an internal buzzer will send a beep sound like “Di-” every 30 seconds. NOTE: Please stop using the device and replace battery or recharge it when you heard the first “Di-” alarm.	★ Battery Indicator & LED lamp blinking There are five-level indicators (Figure 4-④), the battery works in full capacity situation when all the five indicators are lighting on. The indicators will go out one by one with battery capacity reduce.
★ Recharge by using Charger 1. Install low-capacity battery: Ensure the low-capacity battery is installed in battery socket besides conctol panel. 2. Connect with the charger: Connect the charger with the product through the AC adapter hole (Figure 3-⑤). Connect to power supply: Connect the charger to 220Vac power supply	★ Recharge by using Recharging Socket 1. Install low-capacity battery: Ensure the low-capacity battery is installed in recharging socket. 2. Connect with AC adapter: Connect the recharging socket with matched AC adapter. Connect to power supply: Connect the AC adapter to 220Vac power supply.
★ Recharging Indication 1. Charging indicator (Figure 3-③) in control panel will be lighting up in recharging process. 2. Charging Indicator will go out when the battery recharging process is complete. Please disconnect with power supply and unplug the charger. NOTE: Turn off the LED lamp during the recharging process is recommended for batter recharging effect.	★ Recharging Indication 1. Charging indicator in recharging socket will be lighting up in recharging process. Charging Indicator will turn to green when the battery recharging process is complete. Please disconnect with power supply and take out the battery from recharging socket.

⚠ NOTE:

1. If the charging indicator does not light up, please ensure the battery is installed well, then check the connection between charger and product (just suitable for EL-Q series), or the connection between AC adapter and recharging socket (suitable for EL-P/S/T series).
2. Power off the LED lamp before you need install or take out the battery. Do not connect the charger with product (for EL-Q series only), or connect the AC adapter with power supply (for EL-P/S/T series).
3. Please use original battery and recharging accessories.

5 Maintenance

5.1 Product Cleaning

● Product Surface Cleaning (Except for LED lamp)

Clean the product surface with a cloth slightly dampened with a mild solution of detergent. Disinfect the product surface by concentration of 70% alcohol before using it.

● LED Lamp Cleaning

Please use specialized soft cloth or cleaning paper for lens to clean LED lamp surface. Do not clean it with alcohol.

⚠ Caution: Immersion disinfection or uperization is not allowed for the product.

5.2 Maintenance

● Regular Maintenance

Lifetime of LED lamp: The life time of LED lamp is 100,000 hours in normal use.

★ Storage: When the product is not used for a long time, please do cleaning and put it back into the original packaging box to save.

⚠NOTE: Do not touch the LED lamp by hand and keep it from scratching.

● Battery Maintenance

Lifetime of battery: Regularly, the battery charge-discharge cycle is 300 in the case of without capacity decay.

★ Battery Maintenance: Please charge the battery more than 6 hours before the first use or long time storage.

⚠CAUTION: Do not use metal to connect battery poles and prevent short circuit.

⚠NOTE: When the product is not used for a long time, please keep the battery separating from product and recharge it every two months, in order to avoid excessive discharge and damage to the battery.

5.3 Electronic Waste Disposal

The electronic waste generated by this product is the waste battery, please dispose it as WEEE regulations and send it to the specialized recycling place.

⚠CAUTION: Please keep the battery away from the fire source so as to avoid explosion.

5.4 Environment Safety and Disposal

When this product reaches its end of life, take it to a collection point designated by local authorities for the recycling of electronic equipment. The separate collection and recycling of the product and its battery at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging to your health and well-being.

Recycle or dispose the lithium battery in accordance with all federal, state and local laws. To avoid fire and explosion hazard, do not burn or incinerate the battery.

6 After-sales service

The Medical LED Headlight is warranted to be maintained by manufacturer or its agents. We give one-year guaranty started from quality problem within the guaranty period we will provide free repairing service and replaced spare part.

This service is not suitable for the situations in below:

- Consumable parts, such as battery;
- Damage caused by using non-NSE accessories;
- Damage caused by accident, abuse, misuse, fire, earthquake or other external caused;
- Damage caused by disassembling the components without permission;
- Not our company authorized service engineer to repair, change, add or remove and made into failure or damage;
- The situation if any NSE serial number has been removed or defaced.

Appendix A Technical Parameters

Attached List A-1 Environment Requirements

	Work Conditions	Transport & Storage Conditions
Temperature	5℃~35℃	-10℃~40℃
Relative Humidity	20%~80%	20%~80%
Atmospheric Pressure	86kPa~106kPa	86kPa~106kPa
Power Condition	rated input voltage is 220Vac	None

⚠ NOTE:

1. Keep the product in a room witch is well ventilated and without corrosive gas.
2. Transportation process must be protect from shaking, rain or snow.

Attached List A-2 General Parameters

Model / Parameters	EL-Q40 EL-Q40+	EL-P35	EL-P45 EL-T4585	EL-S50100
Beam Diameter	＞55mm @40cm	＞35mm @35cm	＞75mm @45cm	＞90mm @50cm
Power	0.2W~1W	0.2W~2W	0.2W~2W	0.2W~2W
Brightness Control	2 Levels	5 Levels	5 Levels	5 Levels
Maximum Illumination	≥18,500Lux (Q40)@20cm ≥25,000Lux (Q40+)@20cm	≥40,000Lux@20cm		≥50,000Lux@20cm
LED Housing Diameter	18mm±2mm			
Color Temperature	3,000k~6,700k			
Lifetime of LED Lamp	100,000h			
Headband Adjustable Range	385 mm～645mm			
Reference Input	100~240V, 50/60Hz, 0.3A			
Battery Capacity	1,200mAh/3.7V or 2,000mAh/3.7V			

Appendix B EMC Declaration

Guidance and manufacture's declaration – electromagnetic emissions -
for all EQUIPMENT and SYSTEMS

<table>
<tr><th colspan="3">Guidance and manufacture's declaration – electromagnetic emission</th></tr>
<tr><td colspan="3">The Medical LED Headlight is intended for use in the electromagnetic environment specified below. The customer of the user of the Medical LED Headlight should assure that it is used in such and environment.</td></tr>
<tr><td>Emission test</td><td>Compliance</td><td>Electromagnetic environment – guidance</td></tr>
<tr><td>RF emissions
CISPR 11</td><td>Group 1</td><td>The Medical LED Headlight uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td></tr>
<tr><td>RF emission
CISPR 11</td><td>Class B</td><td rowspan="3">The Medical LED Headlight is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.</td></tr>
<tr><td>Harmonic emissions
IEC 61000-3-2</td><td>Not applicable</td></tr>
<tr><td>Voltage fluctuations / flicker emissions
IEC 61000-3-3</td><td>Not applicable</td></tr>
<tr><td>RF emissions
CISPR 15</td><td>Comply</td><td>The Medical LED Headlight is not suitable for interconnection.</td></tr>
</table>

Guidance and manufacture's declaration – electromagnetic immunity –
for all ME EQUIPMENT and ME SYSTEMS

Guidance and manufacture's declaration – electromagnetic immunity			
The Medical LED Headlight is intended for use in the electromagnetic environment specified below. The customer or the user of The Medical LED Headlight should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	6 kV contact 8 kV air	6 kV contact 8 kV air	Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	2 kV for power supply lines	2kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV line(s) to line(s)	± 1 kV line(s) to line(s)	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of The Medical LED Headlight requires continued operation during power mains interruptions, it is recommended that The Medical LED Headlight be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3A / m	3A / m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE:U_T is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacture's declaration – electromagnetic immunity – for ME EQUIPMENT and ME SYSTEMS that are not LIFE-SUPPORTING

Guidance and manufacture's declaration – electromagnetic immunity			
The Medical LED Headlight is intended for use in the electromagnetic environment specified below. The customer or the user of Medical LED Headlight should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	3 Vrms 3 V/m	Portable and mobile RF communications equipment should be used no closer to any part of The Medical LED Headlight including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Portable and mobile RF communications equipment should be used no closer to any part of the including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.167\sqrt{P}$ $d = 1.167\sqrt{P}$ 80 MHz to 800 MHz $d = 2.333\sqrt{P}$ 800 MHz to 2.5 GHz Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, a should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol:
NOTE 1 : At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2 : These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which The Medical LED Headlight is used exceeds the applicable RF compliance level above, The Medical LED Headlight should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating The Medical LED Headlight. [b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Recommended separation distances between portable and mobile

RF communications equipment and the EQUIPMENT or SYSTEM –
for ME EQUIPMENT or ME SYSTEM that are not LIFE-SUPPORTING

Recommended separation distances between portable and mobile RF communications equipment and The Medical LED Headlight Equipment.

The Medical LED Headlight is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of The Medical LED Headlight can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and The Medical LED Headlight as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1.167\sqrt{P}$	80 MHz to 800 MHz $d = 1.167\sqrt{P}$	800 MHz to 2,5 GHz $d = 2.333\sqrt{P}$
0.01	0.117	0.117	0.233
0.1	0.369	0.369	0.738
1	1.167	1.167	2.333
10	3.690	3.690	7.377
100	11.67	11.67	23.33

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

EC REP

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