# **OPERATING INSTRUCTIONS MANUAL**

# **BLUEDENT POWER PEN (COLOR) cordless**

Dental LED curing light

Ref.#200-003(p)









Thank you for trusting our products!

Carefully read this Operating instructions manual before installing and operating the unit to use and maintain it successfully!

Save this Operations guide for your reference in the future.

#### **CONTENTS:**

- I. UNIT DESCRIPTION AND FUNCTION
- **II. SYMBOLS**
- **III. SAFETY PRECAUTIONS**
- **IV. TECHNICAL DATA**
- V. COMPLETE SET
- VI. PREPARATION AND SEQUENCE OF OPERATION
- **VII. ROUTINE CARE AND MAINTENANCE**
- VIII. WARRANTY CONDITIONS
- IX. SERVICE DATA
- X. FAQ
- XI. DECLARATION OF CONFORMITY
- XII. BLUEDENT DATA

#### I. UNIT DESCRIPTION AND FUNCTION

Dental LED curing light BLUEDENT POWER PEN (COLOR) is an accessory to a medical device - specialized light source for intraoral polymerization of dental materials, sensitive to the blue part of the light spectrum.

The device is intended for use only by a qualified dental practitioner and in a dental practice.

BLUEDENT POWER PEN / COLOR consists of Wireless handpiece with stand and Charging adapter.

BLUEDENT POWER PEN / COLOR is manufactured in conformity with the requirements of Regulation on medical devices MDR 2017/745 and standards ISO 13485:2016, ISO 9001:2015.



## **II. SYMBOLS**

	Caution!
$\triangle$	Indicates the need for the user to consult the instructions for use for important cautionary information such as warnings and precautions that cannot, for a variety of reasons, be presented on the medical device itself.
Πi	Consult instructions for use  Indicates the need for the user to consult the instructions for use.
4	Dangerous voltage  To indicate hazards arising dangerous voltage.
*	Hazardous light emission  To indicate hazards arising from light radiation.
<u></u>	Hazardous thermal effects  To indicate hazards arising from thermal effects.
•••	Manufacturer Indicates the medical device manufacturer.
س	Date of manufacture  Indicates the date when the medical device was manufactured
MD	Medical Device  Indicates the item is a medical device
UDI	Unique Device Identifier  Indicates a carrier that contains Unique Device Identifier information
REF	Catalogue number  Indicates the manufacturer's catalogue number so that the medical device can be identified.



	Serial number
SN	Indicates the manufacturer's serial number so that a specific medical device can be identified.
	Batch code
LOT	Indicates the manufacturer's batch code so that the batch or lot can be identified.
	Applied part type B according to electric safety classification
∫_ 40°C	Temperature limit
10°C	Indicates the temperature limits to which the medical device can be safely exposed.
75%	Humidity limitation
30%	Indicates the range of humidity to which the medical device can be safely exposed.
	Waste Electrical and Electronic Equipment (WEEE)
	According to Directive 2012/19/EU, this symbol indicates that the product
	should not be disposed of as urban waste at the end of its operating life.
	Fragile
I	Indicates a medical device that can be broken or damaged if not handled carefully.
	European Conformity
CE	Indicates conformity with local laws and regulations within the European Economic Area



#### **III. SAFETY PRECAUTIONS**



# GENERAL WARNINGS:

BLUEDENT is a Class I accessory to a medical device and it meets the strict requirements of the Medical Devices Regulation - MDR (EU) 2017/745. In order to be used safely for staff and patients, the following rules must be observed:

- Do not allow unauthorized and untrained personnel to use the device to avoid risks.
- Disconnect the device from the mains after completing the procedures.
- Do not use or store the device in a dusty environment.
- Do not expose the device to direct sunlight.
- Do not spray disinfectant directly into the device only rubbing with a swab drained of disinfectant is acceptable.
- Do not get wet or drop liquid on the device, cables, adapter to avoid electric shock or damage to the device.
- Store the device in a dry place, moisture can cause electric shock and damage.
- In case of a problem, disconnect the device from the mains, do not to make attempts to repair, take the device to a service center.
- The device must not be used if any of its parameters are not normal (timer, light intensity, heat radiation).
- The bleaching head must not be covered, the cooling openings must not be closed so as not to cause the device to overheat and ignite.
- Strong electromagnetic fields in the building can cause interference and malfunction of the device. If their source cannot be determined, change the location of the device and plug it into another socket or other room, even in another building.
- Opening and repairing the appliance may only be carried out by authorized service technicians from the manufacturer.
- Only original BLUEDENT parts must be used when replacing defective parts. The warranty of the device does not cover the damage caused by the use of non-original spare parts. The device or any of its parts must not be disassembled while it is connected to the mains!
- Y Fragile! Use caution when transporting, using and storing the device!
- According to Directive 2012/19/EEC, this symbol indicates that the product should not be disposed as a general waste at the end of its lifespan. The product must be taken to a specialized center for the separate collection of electrical and electronic equipment according to local regulations. Proper disposal of equipment that is no longer used prevents negative consequences for the environment and human health!



- In accordance with the requirements of MDR (EU) 2017/745, user and / or the patient must report any serious accident that have occurred during us of the device to the manufacturer and the competent authority of the Member State in which the user/patient is established.
- All packaging materials of the product must be kept away from children to avoid risks of injury / suffocation.

## **SAFETY MEASURES AND RISKS**

The device must be used in strict accordance with the Operating Instructions Manual.



# 1. Electrical safety

Before starting the appliance, make sure that the voltage and the type of plug correspond to the mains supply in the country. Use only the original adapter type SYS1638-0605-W2E.

Electrical safety is ensured by class II protection against electric shock according to EN 60601-1.

BLUEDENT must only be operated indoors, under the following conditions:

- temperature from + 10 ° to + 40 ° C;
- relative humidity 30 75%;
- lack of dust in the room;
- atmospheric pressure 700 1060 hPa;
- absence of chemically active and flammable substances;
- no part of the device should be wetted or immersed in water;
- the device or any of its parts must not be disassembled while it is connected to the mains!

Protect the cables of the appliance from insulation damage and breakage from sharp objects, strong pulling, rodents, chemicals. If such damage is noticed on the electrical cables, it is necessary to take the device immediately to the company service. The device must not be used with damaged cables.

In case of thunderstorms, the procedures must be stopped and the plug must be disconnected from the mains.

Risk: Failure to comply with these instructions may result in electric shock to users of the device.







# 2. Light radiation

BLUEDENT is a source of extremely intense light in the blue range, to which the human eye has a high sensitivity. This results in serious measures to be taken for patients, medical staff and accidentally nearby people, animals and plants.

As such, use protection goggles for the operator.

Irradiation of the eyes and skin with intense light carries a risk of damage from light and heat.

The light should never be directed at the eyes! Irradiation should be limited to the workplace area. The special safety goggles from the set that meet the requirements must be used:

- to cover the eyes and temples tightly, even if the person is wearing optical glasses.
- be made of volumetric colored impact-resistant plastic.
- do not transmit light with a wavelength of 380 600 nm.
- reduce the intensity of the blue spectrum by more than 100 times.
- have a stable mechanical structure, no scratches, cracks and damage to its surface.

The device can be used only after a doctor's consultation on or by persons suffering from photo-biological reactions; persons taking photosensitive drugs; persons undergoing cataract surgery, persons with retinal diseases, etc.

The risk of improper irradiation is severe eye irritation, temporary spots in the visual field, severe visual impairment in direct radiation, to loss of vision.



#### 3. Thermal radiation

The thermal effect is due to the absorption of the energy of the blue light in the tissues, during which the energy is converted into heat. The risk is only with prolonged overdose.

Risk of pain, burning of soft tissues.



## 4. Fire safety

- Keep the device away from solvents, flammable liquids and powerful heat sources.
- Do not expose to direct sunlight.
- Do not allow liquids and detergents to enter the device, as this may cause a short circuit and fire or cause potentially dangerous damage.
- If the product emits an odor or smoke disconnect from the mains, do not attempt to repair it, take it to a service center.

Risk of fire, explosion and damage.

#### 5. Contraindications:

- The device <u>can be used only after medical consultation on or by:</u> persons with implanted cardiac pacemaker; persons suffering from photobiological reactions; persons taking photosensitive drugs; persons undergoing cataract surgery; persons with retinal diseases; people with allergies; people who have recently undergone cosmetic surgery on the face or lips, including injections of hyaluronic acid or botox; people with very sensitive skin or dermatitis, etc. If you are taking photosensitizers or medicines, check the package leaflet.



#### **IV. TECHNICAL DATA**

- 1. Operating voltage 3.7V Li Ion battery type LIR 14500 (800mAh capacity)
- 2. Power consumption mains adaptor: SYS1638-0605-W2E
- 110-240VAC / 50-60Hz input voltage
- Output: 5VDC / 1.2A micro USB socket
- 0.5A max power consumption
- 3. Dimensions of cordless handpiece:
- min. diameter 18mm, max diameter 25mm
- length 148 mm (without lightguide)
- 4. Weight of cordless handpiece (with lightguide and protection filter)
- POWER PEN COLOR (plastic handpiece) 80g
- POWER PEN (metal handpiece) 100 g
- Holder 276g
- 5. Polymerization mode RAMP mode with soft start.
- 6. Light source 2 band LED module with reflector optics.
- 7. Emitted light blue, visible spectrum, 410-490 nm.
- 8. Light intensity up to 1100 mW/sq.cm

Intensity is constant and not dependent on battery charge level.

- 9. Emitting time:
- 10 / 20 / 30 sec. /±10%
- 10. Working ability after fully charged battery up to 2100sec. (210 cycles x10sec).
- 11. Charge time 3 hours for full charge and 2 hours to 80% charge.
- 12. Visual indication color indication ring and audible signal every 10 sec.
- 13. Low battery warning. Fully discharged battery indication.
- 14. Fiberoptic lightguide (rotatable 360 degrees)
- 15. Working mode (1 min. work / 10 min. pause)
- 16. Degree of protection against electric current applied part type B.

The manufacturer of this unit declares to provide on request all additional necessary technical documentation / information which will help the user's technical staff to service the parts of the unit which the manufacturer has claimed to be a subject for repair.

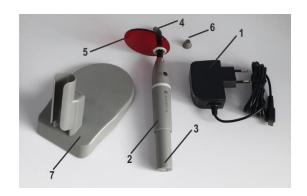


#### V. COMPLETE SET

- 1. Charge adaptor with micro USB output 5V DC / 1.2A 1 pc.
- 2. Cordless handpiece 1 pc.
- 3. Battery pack 1 pc.
- 4. Lightguide 1 pc.
- 5. Protection shield 1 pc.
- 6. Protection cap 1 pc.
- 7. Holder 1pc.
- 8. Operations guide 1 pc.

## Control and indication:

- 1. USB charging connector
- 2. Start / Stop button
- 3. Illuminated indicator ring
- 4. Battery pack





## **VI. PREPARATION AND SEQUENCE OF OPERATION**

BLUEDENT POWER PEN (COLOR) is designed for use as a battery powered unit.

1. Take the curing light out of the packing and assemble the holder by inserting the upper part into the base part (as shown on picture below). Place the holder on a horizontal surface.



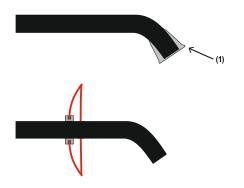




2. Mount lightguide and protection shield or protection cap. See VII. ROUTINE CARE AND MAINTENANCE for instructions of initial cleaning and mounting.



NOTE: Lightguide and protection cap must be sterilized before every use! They are delivered in a non-sterile state and must be sterilized beforehand first use. Before each patient, the light guide (only it, without the handpiece) must be cleaned mechanically and then with a disinfectant (e.g. Desident CaviCide or another approved by the Ministry of Health) and sterilized by autoclaving at 134 ° C for 5 minutes.



For polymerization of posterior teeth (attach as shown)
(1) Protection cap

For polymerization of anterior teeth / general application

Connect the power adapter to charge battery if needed.



The device can be operated during charging.

Unplug the charger after charging the device or at the end of the day.

#### 3. Indication

## 3.1. Color indication ring

<b>Deactivated mode</b> - Color indication ring is not lit.	■ RASONE O
Work mode – polymerization.	
Battery charge / sound signal.	
Fully charged battery – device can be unplugged from adapter.	



Overheating – <b>Thermal protection activated</b> , wait until device cools down.	
Battery is completely discharged - plug into the charging adapter.	

## 3.2 LED module

LED module indication:



Blinking means that the battery is discharged - there is only 20% charge left, you have the option of 5-25 starts of 10 seconds to full discharge.

## 4. Choosing timer mode:

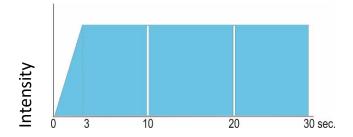
- SINGLE Press the Start / Stop button 10 sec.
- DOUBLE Press the Start / Stop button 20 sec.
- TRIPLE Press the Start / Stop button 30 sec.



After the set time has elapsed, the unit will turn off the output light. If desired, the dentist can interrupt the cycle by pressing the Start / Stop button again.

During operation, the fiberoptic lightguide must be at a distance of at least 2 mm from the obturation.

Diagram of curing mode – RAMP





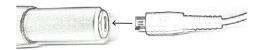
### 5. Overheating protection

The unit is equipped with overheating protection, which is activated if the temperature of the LED module rises up to 50°C. When overheating protection is activated the color ring will blink in yellow next 60sec, then is deactivated until the temperature of the handpiece reaches 35°C. It is necessary to wait for device's cooling down.

## 6. Battery – maintenance, charging and replacement

The device uses Li-Ion battery type LIR 14500 / 3,7V / 800 mAh.

**Charging the battery** - by connecting the charging adapter to the mains. Attention! Connect properly to the socket! Unplug the adapter after charging.



Charge adaptor is SYS1638-0605-W2E - 100-240VAC input and 5VDC output - micro USB type. It is not allowed to use another type power supply.

### Low Battery indication:

- rare flashes of the output light from the lightguide when 15-20% of the charge remains of the battery. It can be used for polymerization as the intensity is stabilized.
- With a fully discharged battery, the color ring will flash blue only a few times.

When charging - the light ring flashes slowly in blue, and when the battery is 100% charged - it lights up continuously. Even if it remains switched on for charging for a longer period of time, there is no danger of overcharging or battery damage. After a full charge, the battery provides up to 2100 seconds work.

It is possible to work with the device during charging.

Monitor the battery charge and recharge if a low level is indicated.

Unplug the charger after charging the device or at the end of the day.

#### When to replace the battery:

- at reduced capacity frequent charging is required;
- in case of battery failure.

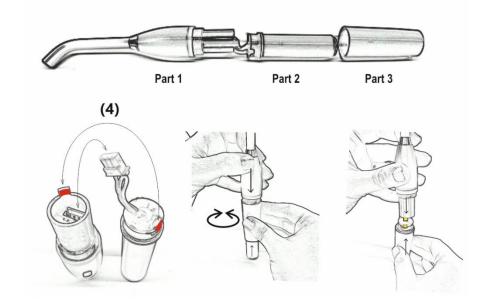


## To replace a Li-Ion battery:

- Disconnect the adapter from the socket and the USB socket.
- Place the handpiece on a non-slip surface and unscrew Part 3. Release Part 2. Carefully remove the connector (4).
- The installation of a new battery is done in the reverse order.
- When assembling the handpiece place Part 2 (containing the battery) on a non-slip surface and press Part 1 to Part 2 at the same time. At the same time, screw the cylindrical Part 3 back to the front conical Part 1.

Note: The parts of the assembly between 1 and 2 must fit! Do not twist the battery cables!

# Use only original Li-Ion batteries by the device manufacturer (LIR 14500 / 3,7V / 800 mAh)!



The battery must not be short circuited, mechanically damaged, immersed in water or to be heated or thrown into a fire.

- Non-functioning batteries can be taken to battery collection points or returned to the device manufacturer.
- When disposing of the battery, observe the environmental protection regulations!

#### VII. ROUTINE CARE AND MAINTENANCE

1. Examining of lightguide / protection cap.

Lightguide is mounted / dismounted by pulling (360



degrees rotatable).

Every day the lightguide tip should be examined for:

- stuck restorative material (it should be removed very carefully with blunt non-metal object);
- mechanical damages on the lightguide.

Remove the light guide and looking through it at strong light: if there are darkened areas over 10% of the area, replace it with a new one.

OK



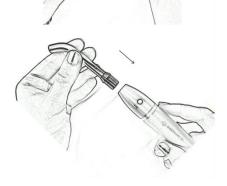
Defective



Lightguide should be sterilized by autoclave at 134° C for 5 min.

The same must be done for protection cap.

The protective filter is wiped only with disinfectant.



## 2. Cleaning of the unit.

For disinfection of the unit, spray the disinfection agent onto a piece of soft cloth / cotton and clean the handpiece and power adapter.

Do not use abrasives or solvents as these may damage the plastic parts of the unit!





Do not spray directly onto handpiece or in button / USB charge connector!





#### **VIII. WARRANTY CONDITIONS**

- 1. Warranty period of BLUEDENT dental curing light is 24 (twenty four) months from the date of purchase. If date of purchase is not written, warranty starts at date of production.
- 2. During the warranty period the replacement of the defective parts is done free of charge by manufacturer's service. Lightguide is not covered by warranty. LED module and battery have 6 months warranty.
- 3. If during the guarantee period the unit is damaged, due to incorrect operation (mechanical, chemical, thermal or electrical damages), damage caused by improper use, storage or any other reasons in user's fault, the repair is paid by the user. If any damage is noticed on electric cables, the device must be brought immediately to manufacturer's service. The device must not be used if cables are damaged.
- 3.1 If liquids, aggressive and flammable substances and their vapors have entered the device, the battery must be removed immediately and sent to the manufacturer's service where the damages are established. In case of such damage, the warranty is lost.
- 3.2 No damages or complaints are accepted as a result of electric shocks, thunderstorms, non-compliance with electrical safety measures or insufficient protection of patients, personnel and other persons from light radiation.
- 3.3 Claims due to improper or insufficient security and care, protection and security during transport, unpacking, relocation, operation and storage of the device are not accepted. The warranty is void for the above events.
- 3.4 The device must only be transported to manufacturer's service only in original packaging in order to avoid unwanted damage. The light guide must be packed separately from the cordless handpiece. The warranty card must be presented (this Guide, with completed Chapter XII BLUEDENT data) or a copy of the sales invoice showing the serial number of the device.
- 3.5 When carrying out repairs by unauthorized persons outside the company service or if non-original elements / parts are used, the user loses the right to free service.



- 4. The manufacturer provides its customers once a year (and in case of a situation immediately) to check in the company service whether the performance of the devices is within the acceptable limits.
- 5. The manufacturer does not owe compensation for lost profits in case of damage or incompleteness operation of the device, whatever the cause.
- 6. In case of disputes in connection with the application and interpretation of this Operating instruction manual, they will be decided by the court in Plovdiv, by virtue of the current Bulgarian legislation.
- 7. The warranty service is performed in the company service at the address:



155, Vasil Aprilov blvd 4027 Plovdiv Bulgaria

tel: +359 32 644089, +359 888 809256

email: office@bglight.com

www.bglight.com



IX.	SERVICE DATA



## X. FAQ

Problem	Solution
No response by button starting	Fully discharged battery. Need to connect to charger to begin charge. Use only the original adapter type SYS1638-0605-W2E. If button continues not to respond - send the device to service.
The button does not respond properly	When working without barrier sleeves, the problem with the button may be the entry of composite, adhesive or disinfectant liquid when the device is used without protective nylons. You need to clean with a cotton swab soaked in alcohol. If the button still does not respond correctly - send the device to service.
Meaning of INDICATION ring colors:	green - RAMP mode - 1500mW/cm2 red - HYPER mode 3500mW/sq.cm red blinking - protection pause blue continuously - 100% charged battery slow blinking blue - in charging mode quick blinking blue 2sec - fully discharged battery yellow - LED module overheating
Slow blinking of blue light of main LED	This is indicator that battery will allow only 5-10 cycles before full discharge. Need urgent charge.
Weak curing effect	It is necessary to clean the emitting tip with a non-metallic object and to clean the adhered composite or other with alcohol. If the result is poor - send the device to the service.
The patient feels discomfort during curing process especially during long curing time 20-30sec	Need to cure at short cycles 10sec or less with short pauses 1-3sec. Sensibility is higher if light is near dental pulp and is



	decreased by every layer. Use RAMP mode.
Power cord or mains adaptor is damaged	Send to service.
Entering some liquid into device	Send to service.
After drop on the floor device is not working properly	Send to service.



#### XI. DECLARATION OF CONFORMITY

BG LIGHT LTD

TECHNICAL FILE
BLUEDENT
LED curing light

## **EU Declaration of conformity**

Developed in conformity with MDR (EU) 2017/745

TD 7.2

Revision 02

Manufacturer: **BG LIGHT LTD** SRN: BG-MF-000019812

Address: 155, Vasil Aprilov blvd., 4027 Plovdiv, Bulgaria

Tel.: +359 32 644089, +359 888 809256, email: office@bglight.com

BULSTAT UIC 115841960, VAT N: BG115841960

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Product:	Product code:	Name:
Dental LED curing light	200-003	BLUEDENT POWER PEN – cordless
	200-003p	BLUEDENT POWER PEN COLOR – cordless

Basic UDI: 3800501374200000VX

EMDN code: Q0190

Classification: Active invasive device (accessory for medical device) of Class I of the Regulation on medical devices -

MDR (EU) 2017/745

<u>Intended purpose</u>: BLUEDENT is designed for photopolymerization of composites and materials used in dental practice (irradiation of blue light 410-490 nm). BLUEDENT is accessory for a medical device as described in Article 2, p.(2) as it performs its intended purpose together with dental composite (material).

The manufacturer declares under its own responsibility that the specified medical device complies with the applicable GENERAL SAFETY AND PERFORMANCE REQUIREMENTS, defined in Annex I of the normative act described below and normative technical documents, when used for its intended purpose and in accordance with the safety requirements.

Document	Title	Edition /
		date of issue
Regulation (EU)	REGULATION (EU) 2017/745 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL	05.05.2017
2017/745	of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC	(last change 24.04.2020)

To achieve compliance, the requirements of the following standards are met:

EN ISO 13485:2016 +/AC:2017/ /AC:2018/ A11:2022 +/AC:2017/ /AC:2018/ A11:2022	Medical devices - Quality management systems - Requirements for regulatory purposes
EN ISO 9001:2015	Quality management systems - Requirements
EN ISO 60601-1:2006 /A1:2013/AC:2014/A2:2022	Medical electrical equipment - Part 1: General requirements for basic safety and essential performance.
EN 60601-1-2:2015/A1:2021	Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral Standard: Electromagnetic disturbances - Requirements and tests
EN 60601-1-6:2010+ /A1:2015 / /A2:2021	Medical electrical equipment - Part 1-6: General requirements for basic safety and essential performance - Collateral standard: Usability
EN 60601-1-8:2007+ /A1:2013 /A11:2017 /A2:2021	Medical electrical equipment — Part 1-8: General requirements for basic safety and essential performance — Collateral standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems
EN ISO 10650:2018	Dentistry - Powered polymerization activators
EN 62304:2006/A1:2015	Medical device software. Software life cycle processes.
EN 62353:2014	Medical electrical equipment. Recurrent test and test after repair of medical electrical equipment



EN 62366-1:2015+ AC:2016/ A1:2020	Medical devices. Application of usability engineering to medical devices.
EN ISO 14155:2020	Clinical investigation of medical devices for human subjects - Good clinical practice
EN ISO 10993-1:2018	Biological evaluation of medical devices - Part 1: Evaluation and testing within a risk management process
EN ISO 14971:2019+/A11:2022	Medical devices – Application of risk management to medical devices.
CEN ISO/TR 24971:2020	Medical devices - Guidance on the application of ISO 14971 (ISO/TR 24971:2020)
EN ISO 15223-1:2021	Medical devices - Symbols to be used with information to be supplied by the manufacturer – Part 1: General requirements
EN ISO 20417:2021	Medical devices - Information to be supplied by the manufacturer
Directive 2012/19/EC	Directive on waste electrical and electronic equipment (WEEE)

Classification is done by the manufacturer according to Regulation on medical devices - MDR (EU) 2017/745, Annex VIII, Rule 13. Conformity assessment procedure according to article 52, paragraph 7 of MDR (EU) 2017/745.

The declaration of conformity is issued in implementation of Annex IV "EU Declaration of conformity" of EU Regulation 2017/745, based on the results of tests carried out and assessment of compliance with the General safety and performance requirements defined in Annex I, implemented and certified Quality Management System - certificates No: AC090 100/1971/4047/2020, AC090 MD/1971/4047/2020 from TUV NORD Polska Sp. z o.o. (NB 2274).

BG LIGHT LTD maintains data on the provision, evaluation and maintenance of compliance of the medical device, according to the requirements of Annex II "Technical documentation" of MDR (EU) 2017/745.

Plovdiv, Bulgaria 01.01.2023 Dipl. Eng. Plamen Karaivanov Manager BG LIGHT LTD





## **XII. BLUEDENT DATA**

SN:	
LOT:	
DATE OF	
PRODUCTION:	
QC:	
DATE OF PURCHASE:	

Last revision: 01.01.2023

Follow www.bglight.com for updated revision of this Operating instructions manual.