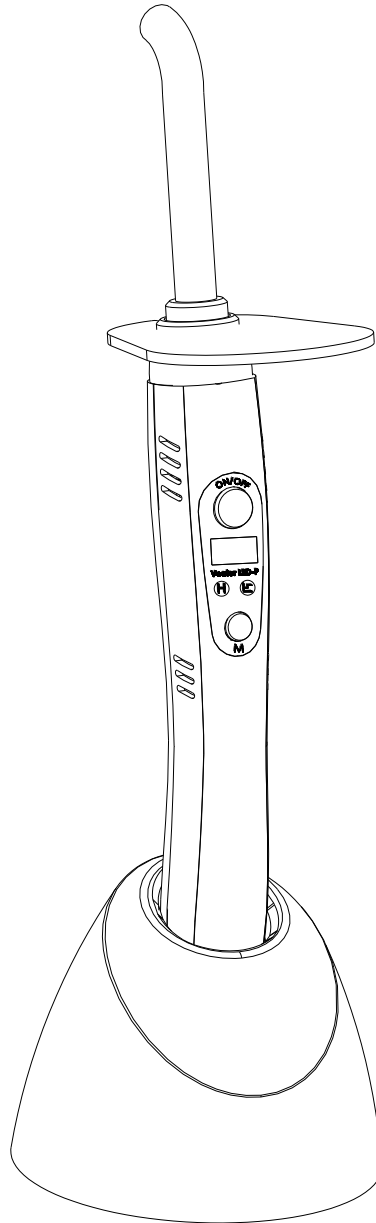


User Manual

**Vector LED Curing Light**

# **Vector LED-P®**



## **Instructions For Use**

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**Caution: For dental use only.**

# 1. PRECAUTIONS AND SAFETY NOTES

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## PLEASE NOTE!

Prior to installation and start-up of the unit, carefully read the instructions provided herein!

As with all technical devices, the proper function and safe operation of this unit depend on the user's compliance with the safety recommendations presented in these operating instructions.



**CAUTION:** This curing unit produces high curing energy output! A significant increase in curing energy is possible compared with conventional Halogen equipment you have previously used. Do not place light directly on or toward unprotected gingiva or skin. Exposure of the soft tissues (gingiva, oral mucosa and skin) to high-intensity light may cause damage or irritation.

Adjust your curing techniques in accordance with the increase in curing energy. Some examples are; decrease curing time, increase composite thickness, increase distance between light guide exit and light cured materials e.g.



**CAUTION:** Do not look directly into the light emitted from this curing unit. It may be harmful to the eyes. Exposure must be restricted to the area of the oral cavity in which clinical treatment is intended. Do not use this device without suitable protective eye shield for the operator, assistant and patient. Suitable protective eye shield should blocks most energy below 550nm wavelength.



**CAUTION:** Persons having a history of photosensitive reactions or who are using photosensitizing drugs should not be exposed to the light from this unit.



**CAUTION:** Equipment is not suitable for use in the presence of flammable anesthetic mixture with air, nitrous oxide or environment full of flammable material. Use in well ventilated area.



**CAUTION:** DO NOT IMMERSE UNIT IN WATER OR DISINFECTANT. Do not spray liquids directly onto the light. Spray a towel, then wipe the light. Prevent liquids from entering openings on unit, especially the socket for re-charging. Refer to Section 10, Cleaning / Disinfecting / Sterilizing for sterilizing instructions.



**CAUTION:** Always unplug the base/charger before disinfecting.









**CAUTION:** Don't dispose of the battery into fire or take battery apart.

1. This product is intended to be used only as specifically outlined in these Directions for Use. Any use of this product inconsistent with the Directions for Use is at the discretion and is the sole responsibility of the practitioner.
2. Keep solvents, flammable liquids, and sources of intense heat away from the unit as they may damage the plastic housing of the charger, the seals, or the cover on the operating buttons.
3. To protect the light guide, after each curing procedure is completed, the handpiece should always be placed back into its holder.
4. To obtain a safety operation, we suggest that check your local AC power supply voltage before you buy and use this product from oversea.
5. Check unit for adequate light output before each procedure. Failure to verify output may allow inadequate curing
6. In order to avoid electric shock do not introduce any objects into the unit with the exception of replacement parts handled in accordance with the Operating Instructions. Do not attempt to change the Curing LED, open or alter the unit in any way
7. Use only genuine Vector R & D parts when replacing defective components as directed in these Operating Instructions. The product's warranty does not cover any damage resulting from the use of third-party replacement parts.

## **2. Glossary of Symbols**

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	Attention, Consult accompanying Documents
	Alternating Current
	Type BF Applied Part; Type BF Equipment - Protection against electric shock
	Equipment class: Class II (IEC601-1) - double insulated
	93/42/EEC Compliant
	Icon to identify electric and electronic devices. The unit must be collected and disposed of separately.

### **3. PRODUCT DESCRIPTION & FIELDS OF APPLICATION**

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The Vector LED-P curing light is a pen-style, cordless, high-performance LED light source curing unit intended for polymerization of resin-based light cured dental materials by dental professionals. Vector LED-P incorporates 5W blue LED to achieve high energy output with wavelength range of 440 to 480nm to polymerize resin-based composite in the market and a high power mode to produce super fast curing effect. The relevant range is for camphorquinone (CQ) containing product. Though the majority of light-curing dental materials are responsive in this range of wavelengths, it is suggested you should contact the filling material maker to make sure it before use.

The Vector LED-P LED curing light is a fast-curing LED curing light. It emits typical light output at about 1,400 mW/cm<sup>2</sup>. 3 Seconds to cure most resin-based composite in the market. It also features:

- ▶ Digital timer display, multiple mode selection: boost (fast curing) and ramp up (soft start),
- ▶ [Two button easy operation,](#)
- ▶ Quiet operation, fan-free design,
- ▶ Rubber button for more comfortable finger touch, and resist water or solution when cleaning up.
  
- ▶ Can be used both cordless and corded,
- ▶ Low battery warning; for urgent use, just insert power cord connector into handpiece,
- ▶ [Rechargeable lithium battery inside,](#) capable of 200 x 10 sec curing cycles prior to recharging,
- ▶ Slim and ergonomic handpiece for most comfortable hand holding, (weight 155g only)
  
- ▶ [8mm diameter sterilizable curing tip,](#)
- ▶ Curing tip rotates 360° for curing at any position of mouth,
- ▶ Versatile fiber optic curing tip optional,

### **4. PACKAGE CONTENT**

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· Charging Base Assembly	X 1 PCE
· Vector LED-P Hand piece Assembly	X 1 PCE
· 8 mm Diameter, Sterilizable Fiber Optic Light Guide	X 1 PCE
· Protective Eye Shield	X 1 PCE
· Wall Plug-in Power Supply	X 1 PCE
· Instructions For Use	X 1 PCE

## 5. TECHNICAL DATA

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### 5.1 Charging Base

Operating voltage:	INPUT: 100~240VAC, 2 A , 50/60HZ
	OUTPUT: 5 V DC , 2 A
Dimensions	
Diameter:	90 mm
Height:	75 mm
Weight:	Roughly 150 g

### 5.2 Handpiece

Power supply:	Lithium battery – 4.2V DC, 2100mAh
Wavelength range:	440-480 nm
Typical light intensity	1,400 mW/cm <sup>2</sup>
Total exposure time with new fully charged battery	Typically 25 minutes
Dimensions	
Diameter:	25~30 mm
Length (with/without light guide):	240 mm / 180 mm
Weight (with light guide and battery):	Roughly 155 g

### 5.3 Charging Base and Handpiece

Time to charge empty battery:	Approximate 1.5 hours
Protection from electric shock:	Type BF (IEC601-1)
Equipment class:	Class II (IEC601-1)
Protection from ingress of liquids:	None
Operation temperature	+10°C ~ +40°C
Relative humidity range	30% ~ 75%
Atmospheric pressure	700hPa ~ 1060hPa

### 5.4 Transportation and Storage Environment

Ambient temperature	-10°C ~ +70°C
Relative humidity range	10% ~ 90%
Atmospheric pressure	500hPa ~ 1060hPa

## 6. INSTALLATION OF THE UNIT

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### 6.1 Initial set-up

**NOTE:** Upon receiving the LED Curing Light, check the packaging and parts for any possible damage that may have occurred in transit. If damage is apparent, please contact your authorized Vector R & D distributor from which the light was purchased.

1. Remove the contents from the shipping package. Be careful not to drop or impact the curing light. Choose a flat, level, sturdy surface to place the charging base on. The light is shipped in a “sleep” mode, and no timer display. To wake the unit, press the On/Off button.
2. Before using for the first time, the light must be fully charged. For the first charge, this process will take about 6 hours. Use only the power supply furnished with the light system. Attempting to use another power supply source may cause injury or damage and will void the warranty.
3. Mode button surrounding (charging indicator) illuminates white light during recharging. It will turn off automatically after battery is fully charged.

**NOTE:** On/off button surrounding (power indicator) illuminates white light, indicates the handpiece is well connected to power supply. If no white light comes out when connecting power plug to handpiece directly or placing handpiece back to charging base, please check the outlet plug is firmly connected or not.

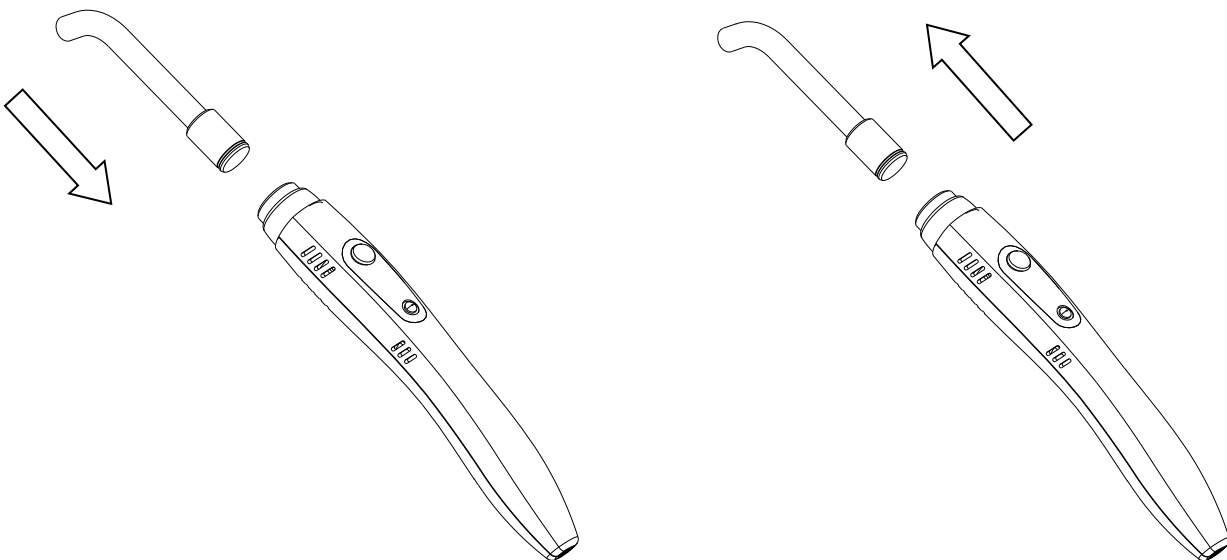


Figure 3 Insert light guide

Disconnect light guide

4. Autoclave the fiber optic light guide prior to first use. Attach the light guide to the hand piece as shown in Figure 3. Please refer to Chapter 7 to get more information of optional light guides.

5. Plug the connector of the power supply into the back of the charging base, or plug it into the bottom end of the Light itself, as shown in Figure 4. Plug the other end of the power supply into the appropriate electrical outlet. As mentioned above, wait for at least 6 hours to completely charge the light before the first use.

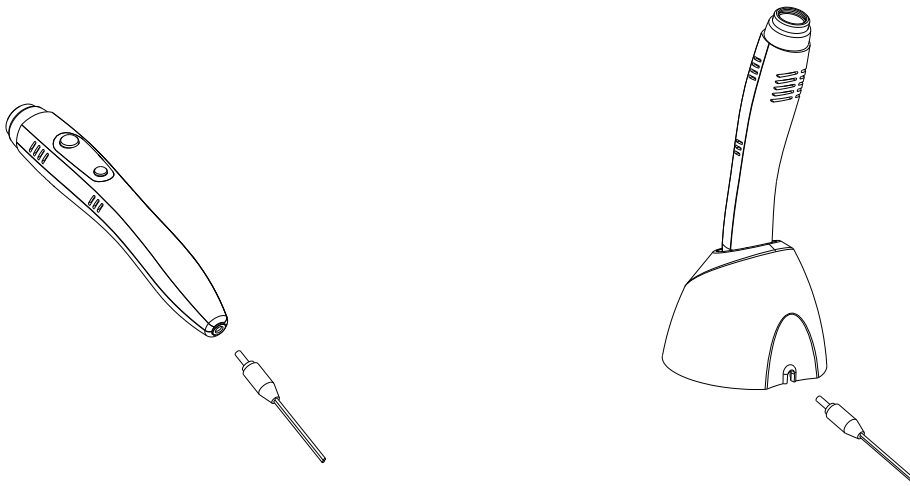


Figure 4

**NOTE:** Verify the line plug of the power supply plug is properly rated for your facility, and that all connections comply with safe practices and all local requirements. Always use unit in conjunction with a properly grounded outlet.

## 6.2 Keypad and modes

There are 2 buttons on the keypad for the mode/timer selection, and the on/off button. (Fig. 5) The on/off button is used to activate and deactivate the light. Push once to turn on the light and push it again if you need to turn it off at any time during the curing cycle.

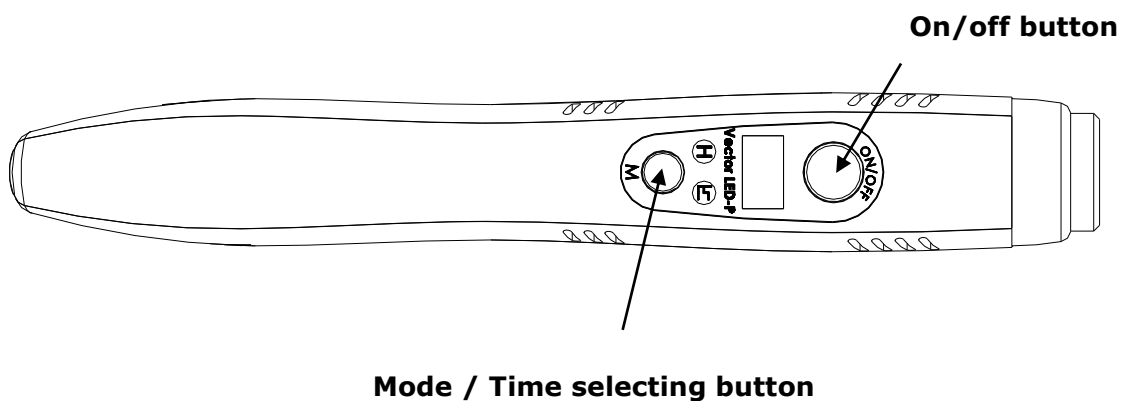


Figure 5

There are 2 different modes to select from based on the procedure and the requirement. (Fig. 6)

- Select the exposure time by pressing the mode button briefly.
- If the mode/timer button is kept depressed, it will switch to another mode.
- While exposure is ongoing, the button for selection of the exposure time is inactive.



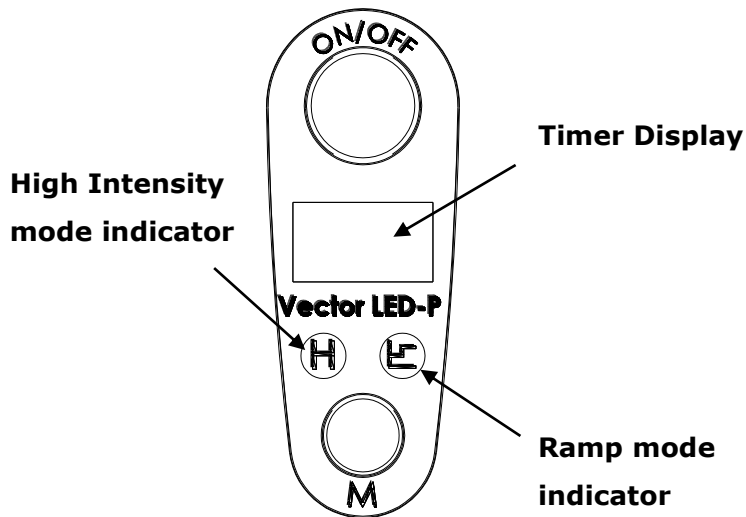


Figure 6

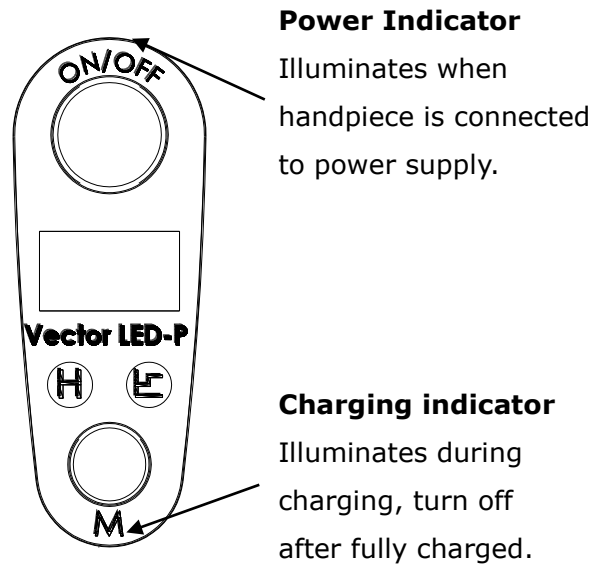


Figure 7

### 6.3 Timer selection:

**(H) Boost** – This mode provides high power to the LEDs, helping them generate a higher power output up to 1,400 mW/cm<sup>2</sup>. Since the LEDs function at such high power level, only the 5 second curing cycle is provided to avoid premature LED failure. You can use multiple boost cycles in succession to obtain longer Boost curing.

Time selection: **3, 5, 10** seconds

**(Ramp) Soft Start** - an initial 35~50% energy of high intensity and then switch to high intensity 1,400mW/cm<sup>2</sup> constant.

**10** seconds (5 seconds low intensity + 5 seconds high intensity)

### 6.4 Battery Charging

To charge the battery, place the handpiece in the charging base, with the power supply attached to the charging base, or attach the power supply directly to the handpiece. When this is done, the POWER INDICATOR (On/Off button surrounding) will illuminate. (Figure 7)

The light may be used with the power supply attached to the handpiece handle, even if the battery is low. While in this configuration, the battery will charge while the unit is not being used. While charging, the BATTERY CHARGING INDICATOR (Mode button surrounding) will illuminate. (Figure 7) When the battery is fully charged, the white indicator will switch off. When the handle is removed from the charger, or the power disconnected, none of the battery indicators will illuminate.

## 7. OPERATION INSTRUCTION

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### Activating and Deactivating the Light:

- ▶ The light will enter "sleep" mode if the unit has not been used for more than 1 minute, the panel display will turn off to conserve power. If the panel display is not illuminated, simply press on/off button to bring it out of the sleep mode.
- ▶ Activate the light by pressing the on/off button on the keypad.
- ▶ Press the on/off button again to turn off (interrupt) the light before the exposure time is over.

### Adjust mode and curing time for the Light:

- ▶ Always use the settings recommended by the manufacturer of the dental material when selecting the settings
- ▶ Please refer to Section 6.3 for more information of mode selection and curing time setting.
- ▶ Make sure everyone is wearing the appropriate eye protection.

### Position the light guide:

- ▶ The probe tip shall be used in close proximity to the material to be cured. Avoid actual contact. The flat end of probe should be parallel to the surface being treated.
- ▶ Rotate the light guide into the optimal position for polymerization.
- ▶ Place the light guide as close to the filling material as possible.  
***Avoid directly contacting the filling material!***
- ▶ Keep the light guide clean at all times to obtain full light intensity.
- ▶ Damaged light guides must be replaced immediately, since damaged light guide may strongly reduces light intensity or injures the patient.

### Warning signal:

- ▶ If the temperature on hand piece is over 50°C, the error code "E2" will show up and buzzer continuously beep 5 tones until the temperature low than 45°C.
- ▶ If the battery voltage runs low, the error code "E1" will show up and buzzer beep continuously 3 tones. Please place handpiece back into charger for recharging.

### Note:

- ▶ Follow material manufacturer's directions for curing times on various materials. It is better to over cure rather than insufficient cure. Over curing should not harm the restoration.
- ▶ If the LED remains activated for an extended period, a safety thermostat will cut off the LED to protect curing gun from overheating. Normal usage may then be resumed if the handpiece is idled for an extended period for cooling.

## 8. OPERATING ERRORS AND TROUBLE SHOOTING

Problem	Cause ▶ Solution
1. No timer display on handpiece.	The unit is in sleep mode. ▶ Press the on/off button to wake the unit.
2. Can not activate/wake the light.	Battery is drained. ▶ Please recharge battery, and try again. Handpiece is out of order. ▶ If not sure what happen, contact the dealer for further inspection.
3. Error code "E2" shows up and buzzer beeps 5 short tones.	Handpiece is overheat ▶ Please wait for minutes to have handpiece cooled down. ▶ Waiting time can be shortened if handpiece is cooled by compressor air.
4. Error code "E1" shows up and buzzer beeps 3 short tones.	Low battery voltage ▶ Battery is drained. Please place handpiece back to charging base for recharging.
5. Charging indicator on handpiece is not on when placing handpiece on the charging base.	Check the power plug connects to power outlet socket firmly. ▶ If not sure what happen, contact the dealer.
6. Battery working time is significantly shortened.	▶ Battery is exhausted after period use (generally 1 year). Please contact the dealer to replace with a new battery. ▶ If not sure what happen, contact the dealer for further information.
7. Whenever press the on/off button or mode button on keypad, there is no response in timer display, nor light.	The light program is crashing. ▶ Use a clip to poke through the hole on the back of handpiece to reset the light program. (Please refer to Section 9, figure 9)

***If the above steps do not solve the problem, contact the dealer or point of purchase.***

**Note:** We and our authorized distributors will make available on request circuit diagram, component part lists and other information to assist user's appropriate technical personnel to repair the light cure units which are designated by us as repairable.

## 9. SERVICE AND REPLACEMENT PARTS

For product service please contact your nearest Vector R & D authorized dealer you purchased product.

### Replacement Accessories

Part #	Description	Contents
<b>1125B70</b>	Vector LED-P Wall Plug-In Power Supply	1x Power Supply
<b>1125B80</b>	Vector LED-P eye protection shield	1x Eye Shield
<b>803</b>	Sterilizable fiber optic light guide 8 mm diameter	1x light guide (8 mm)
<b>1125A19</b>	Vector LED-P Charging Base Assembly	1x Charging Base
<b>1125A20</b>	Vector LED-P Handpiece Assembly	1x Handpiece

### Optional accessories

Part #	Description	Contents
<b>LM200</b>	Digital Light Radiometer 200	1x Light meter 200
<b>810</b>	Sterilizable fiber optic light guide 10mm diameter	1x 10mm diameter
<b>809</b>	Sterilizable fiber optic light guide 8>3mm diameter	1x 8>3mm diameter
<b>807</b>	Sterilizable fiber optic light guide 12>8mm diameter	1x 12>8mm diameter
<b>805</b>	Sterilizable fiber optic light guide 12mm diameter	1x 12mm diameter
<b>803</b>	Sterilizable fiber optic light guide 8mm diameter	1x 8mm diameter

**Note: The handpiece program might crash in some special cases - no response when you press buttons on the keypad. You can reset the hanpiece program by poking through the cave on the back of handpiece to resume its function when it stops working (See Figure 9.1).**

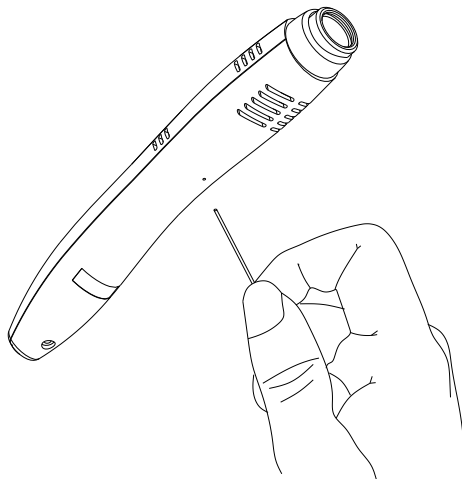


Figure 9

## **10. Cleaning / Disinfecting / Sterilizing**

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### **10.1 Cleaning and Disinfection of Fiber Optic Light Guide**

- ▶ Clean and disinfect the light guide before every use. The light guide is not sterile when delivered and must be sterilized before being used for the first time.
  
- ▶ Please check the manufacturer's information about the cleaning and disinfecting agents.
- ▶ Make sure that the cleaning and disinfectant agents you have chosen do not contain any of the following materials:
  - Organic, mineral, and oxidizing acids (minimum acceptable pH value 5.5)
  - Bases (maximum acceptable pH value 8.5)
  - Oxidation agents (e. g., hydrogen peroxide)
  - Halogens (chlorine, iodine, bromide)
  - Aromatic/halogenized hydrocarbons
  
- ▶ The light guide must not be exposed to temperatures higher than 134 °C (273 °F).
  
- ▶ Use a soft brush or a soft cloth to manually remove gross contaminations. Adhering polymerized composite should be removed with alcohol, a plastic spatula may help in removing the material. Do not use any sharp or pointed tools to protect the surface of the light guide from scratching.
  
- ▶ To disinfect, place the cleaned light guide for the specified application time into the solution, making sure that it is completely covered. Disinfectants containing ophthalmaldehyde are recommended.
- ▶ Remove the light guide from the solution and rinse thoroughly (at least 10 sec.) in water with low germ count.
- ▶ Dry the light guide with a clean cloth.

### **Sterilization**

Effective cleaning and disinfection are absolutely essential requirements for effective sterilization. Only steam sterilization is approved as a sterilization procedure:

- ▶ Maximum sterilization temperature 134 °C (273 °F)
- ▶ Sterilization time (exposure time at sterilization temperature) at least 20 min. at 121°C (250 °F) or at least 3 min. at 132 °C (270 °F) /134 °C (273 °F)

### **Check**

Before using the light guide again, check it for damaged surfaces, discoloration, and contamination; do not use damaged light guides. If the light guide is still contaminated, repeat the cleaning and disinfection.



**CAUTION:** The charging base shall be unplugged before cleaning and disinfection of the charging base to prevent from electric shock.



**CAUTION:** To immerse or spray the out surface of charging base and handpiece with water, cleanser and chemical disinfectant is not allowed as it may result in electric shock and damage of inner circuit board.

## **10.2 Clean Charging Base, Handpiece, and Glare Shield**

- ▶ To disinfect all components, spray the disinfectant on a towel and use it to disinfect the unit. Do not spray the disinfectant directly on the handpiece or the charging base.
- ▶ Clean the keypad glass of the handpiece with a soft and fluff-free cloth.
- ▶ Dry residual disinfectants on the charger, the handpiece and the glare shield with a soft and fluff-free cloth, as they damage the plastic components.
  
- ▶ Clean the charging base, the handpiece and the glare shield with a soft cloth and, if required, a mild cleaning agent.
- ▶ Solvents or abrasive cleaners may not be used in any case, as they damage the plastic components!
- ▶ Make sure that charge connector remains dry and is not contacted by metallic or greasy parts. Do not bend the charge connector during drying. Wet charge connector will cause an operating error.

## **11. Disposal**

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**Follow the national requirement and regulation to dispose of the unit.**

As a mean of protection of the environment, your new device is equipped with lithium battery. This kind of battery is free from toxic heavy metal ions. Dispose of battery and units in accordance with local legal regulations.

## **12. Disclaimer**

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VECTOR R & D considers itself responsible for the effects on safety, reliability and performance of this product only if:

- ▶ Assembly operations, extensions, re-adjustments, modifications or repairs are carried out by persons authorized by VECTOR R & D.
- ▶ The electrical installation of the relevant room complies with the requirements.
- ▶ The equipment is used in accordance with this instruction for use.

## **13. Warranty**

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### **13.1 Malfunction**

Vector R & D hereby warrants that for a period of one year from the delivery date, this device shall be free from defects in material and workmanship. In case the machine is found malfunctioned under normal use, Vector R & D will offer service of free maintenance and parts for replacement.

### **13.2 Repair**

Repairs must be only carried out by an authorized Vector R & D engineer/dealer. If repairs during warranty period are not carried out by an authorized engineer/dealer, warranty will expire immediately.

### **13.3 Warranty Exception**

The warranty stated herein is the sole warranty applicable to Vector R & D products. Vector R & D expressly disclaims the liability for warranty even within warranty period, if

- (1) Damages caused by natural disaster.
- (2) Operator's fault or wrong operation.
- (3) Application use other than field specified in this instruction.
- (4) A malfunction or damage caused by repair, adjustment, modification which is not carried out by Vector R & D authorized technicians/dealers.
- (5) A malfunction caused by abnormal power source or voltage.
- (6) It is a consumption part.

(This instruction subjects to change without pre-notice)