

# USER MANUAL



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# WARRANTY INSTRUCTION

## I Period validity:

## II Range of warranty:

During the warranty period, we promise to be responsible for the product quality, such as raw materials or processing defects.

## III The following are beyond out warranty:


- ①. Damage caused by non-compliance with the operation manual or use for abnormal functions.
- ②. Man made damage caused by improper operation or unauthorized disassembly.
- ③. Damage caused by improper transportation or storage and lack of maintenance.
- ④. No signature or seal from the dealer or incomplete warranty filling.

DENTAL LOW-VOLTAGE ELECTRIC MOTOR WARRANTY CARD		DENTAL LOW-VOLTAGE ELECTRIC MOTOR WARRANTY CARD		DENTAL LOW-VOLTAGE ELECTRIC MOTOR WARRANTY CARD	
Name of Customer		Name of Customer		Name of Customer	
Address Details		Address Details		Address Details	
Postal Code		Postal Code		Postal Code	
Tel		Tel		Tel	
Model		Model		Model	
Unit No.		Unit No.		Unit No.	
Handpiece No.		Handpiece No.		Handpiece No.	
Purchase Date		Purchase Date		Purchase Date	
Contact person		Contact person		Contact person	
Date	Maintenance Record	Repairer	Date	Maintenance Record	Repairer
1.For Customer 2.For Distributor 3.Return to Manufacturer			1.For Customer 2.For Distributor 3.Return to Manufacturer		


# INTRODUCTION

## 1. Equipment Classification

Classified by type of anti-electric shock:

- Class II equipment: 

Classified by degree of anti-electric shock:

- Type B application part: 

Classified by the sterilization or disinfection method recommended by manufacturers:

- See Chapter 6 for Sterilization

Classified by the degree of safety when used in flammable anaesthetic gas mixed with air temperature into flammable anaesthetic gas mixed with oxygen or nitrous oxide:

- Equipment used in the case of flammable anesthetic gases which cannot be mixed with air or with oxygen or nitrous oxide.

Classified by operation mode:

- Intermittent operation

This product is designed for intermittent operation mode S3, where 3 minutes operation time is suspended for 10 minutes. The user should be responsible for the use and the shutdown of the system timely.

## 2. Representation of all matters needing attention and hazard matters

- For the safety of you and the patient, please read and understand all contents of this instruction manual carefully before operation.

- Please pay attention to the representation of hazardous matters so as to avoid the damage to you and others due to incorrect use. The following items are classified according to the degree of possible danger and/or damage, which are all precautions for safe use. Please read and abide by them carefully.

Attention	The severity of the possible danger or damage.
Warning	Precautions indicating the possible injury to personnel or the damage to objects.
Caution	Precautions indicating the possibility of causing minor or severe injury or damage to the objects.
Notice	Precautions that you are requested to follow for your safety.

### Warning

- Do not touch the power wire with wet hands to prevent electric shock.  
Do not attach the control components to water or other liquids, which may cause electric shock and other risks due to short circuit.
- If there occurred smoke or peculiar smell like resin burning, please directly turn off the power switch and entrust repair immediately
- Do not use in a room with explosion risk or near flammable substances.
- Pay full attention to vibration, heat and noise and other phenomena and stop immediately if you feel abnormal before or during the use.

### Warning

- The safety of the patient as the priority, and be sure to pay attention to the safety when using this product.
- This product is limited to dental treatment by qualified dentists. Do not use it in oral surgery or implant therapy.
- Please connect each part accurately, otherwise, it may cause LED light off, and water leakage or air leakage.
- It is strictly prohibited to hit this product, especially do not drop the product. Otherwise, it may cause a failure in function.
- The product works normally in the place where the temperature is 5℃~40℃; Humidity being 15%RH~80%RH; air pressure being 860hPa~1060hPa; and no water droplets on the control assembly. Failure may occur if the product is operating outside of this location.
- Do not distort the electrical wire when installing the control main engine or motor. Do not apply an abnormal force during the installation.

### Warning

- Do not connect the micro brushless direct-current motor to other models or low-voltage electric motor products of other manufacturers to avoid abnormal operation.

#### Control main engine

- Do not replace the wire near the gas burner. Do not repair the burnt motor wire and

replace it with a new one.

- Please pay full attention to whether there is looseness, vibration, abnormal sound, heating (temperature), etc. Before use, please make sure to make it rotate outside the patient's mouth for inspection. At this time, even if you feel a slight abnormality, please stop using it and contact the distributor.
- Do not splash water on the equipment, which may cause fire or electric shock due to short circuit. Handpiece (purchased separately)
- Do not use it under high load for a long time. Otherwise, it may cause heat.
- Please remove the handpiece after the motor rotation completely stops (purchased separately).
- Do not connect/disassemble the handpiece during the operation.
- Be sure to adjust the rotation speed within the allowable rotation speed range of the handpiece (purchased separately) before use.
- Requirements for water source of water tank: please use purified water or distilled water, otherwise, it may block the motor wire or the handpiece.
- Do not perform high temperature autoclaving sterilization treatment (or any other high-temperature sterilization treatment) on the control main engine, motor wire, etc.
- Responsibility for correct operation control, maintenance and inspection of the equipment should be borne by the operator.

#### Notice

- If a computer or LAN cable is placed close to the working motor or the motor wire, sometimes it will exert an influence. In addition, if there is a receiver such as a radio near the motor or the motor wire, noise may sometimes be generated.
- After use, please turn off the power switch and remove the water in the water tank, handpiece and motor wire when it has not been used for a long time.
- Please keep the product in a place free from dust, sulfur and salt, with a temperature of -40℃~55℃, humidity of 8% RH~93% RH and atmospheric pressure of 500hPa~1060 hPa.



#### Matters needing attention

**Please read the following carefully before use**

1. This device should only be used for the contents involved in the manual, not for other purposes. Please operate in strict accordance with the operation manual. We will not assume any responsibility for any accident caused by the failure to operate according to the operation manual.
2. Before use, make sure that the voltage is within the operating range. Improper input voltage will damage the device and cause harm to the operator and the patient.
3. Please use the original accessories, such as: brushless direct-current motor. Our company will not be liable for any problems and hazards caused by the use of relevant accessories not provided by us.
4. This product is an electronic product. Do not insert anything into the device to avoid electric shock hazard.

5. When installing the control box, avoid twisting the connecting tube or power wire.
6. Avoid liquids such as cleaning agents from entering the control box in case of short circuit or other problems.
7. Cut off the power immediately if any abnormality in the device. It is not allowed to modify the equipment circuit or device without authorization. Any disassembly or modification may result in equipment abnormalities.
8. Turn off the power after each use. For long-term placement, drain the water from the equipment and hoses first.
9. Avoid strong electromagnetic interference from the equipment. Do not place the device near strong electrical equipment or near patients with a pacemaker.
10. Unstable voltage or magnetic field interference will affect the proper operation of the device.
11. This device is intended for professionals only.
12. Please sterilize the dental handpiece and brushless direct-current motor for the first use.
13. This product is designed for use with normal saline. Only suitable flushing fluids should be used and operated in accordance with the medical data and operating instructions provided by the manufacturer. Plus Power approved disposable water supply pipes or fittings should be used.
14. External accessories available for other manufacturers :
  - Only the registered and valid pre-sterilized disposable water supply pipe for oral implant is used. With the specification of 6mm×4mm for extrusion section. If the water supply pipe does not conform to the specification, the water supply of cooling system may be reduced.
  - Only the handpiece that complies with YY/T 1012-2004 dimensions of coupling for dental handpiece (ISO 3964) is used. If the handpiece does not meet the requirements of the above standard, the equipment failure may occur.

### 3、Responsibility of the manufacturer

The manufacturer assumes responsibility for the safety, reliability and performance of dental low-voltage electric motors only when operating in accordance with the following instructions:

- The dental low-voltage electric motor must be used in accordance with the Instruction Manual for Dental Low-voltage Electric Motor.
- Any component of dental low-voltage electric motor can not be repaired and assembled by the user. If maintenance and assembly is required, it must be carried out by authorized Plus Power service partners.
- When conducting electrical installation in the place of use, relevant provisions of GB 9706.15-2008 Medical Electrical Equipment or applicable regulations of your country must be observed.
- If the equipment is opened without authorization, all warranty requirements and any other requirements within the warranty period will be invalid.

# COMPONENTS LIST



## Scope of application and population

**Scope of application:** It is suitable for general dental use, with the use of straight and contra-angle handpieces and accessories of equal speed, increasing speed or decreasing speed, for cavity shaping, crown shaping, crown refinement, filling, polishing and other treatments.

**Intended use:** This device is suitable for cutting, grinding and polishing of teeth.

**Used:** For dentists trained in clinics or laboratories only.

**Applicable to:** Dental patients whose symptoms are confirmed by the physician to be suitable for dental surgery.

**Place of use:** This product is applicable to hospitals, large clinics and small clinics.

**Patient contraindication:** The patient suffers from heart disease, blood disease, hypertension, mental disorder and other symptoms confirmed by the physician to be unsuitable for dental surgery.

## Technical data

### 1.Control Terminal

Model	Super Micro S Plus
Size of Control Terminal	L 300mm×W 280mm×H 128mm
Size of water tank	L 200mm×W 100mm×H 80mm
Input Voltage	220VAC
Allowable voltage fluctuation	±10%
Rated current	0.1A-0.8A
Frequency	50Hz/60Hz
Power fuse	2×250V-T1.6AH
Maximum power consumption	180VA

*\*This main engine belongs to conventional equipment (i.e. closed equipment without anti-seepage water protection)*

### 2.Brushless motor

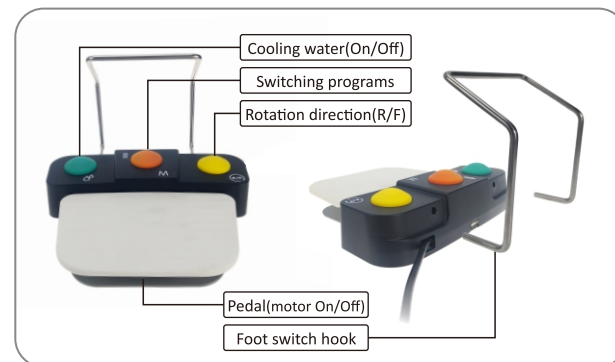
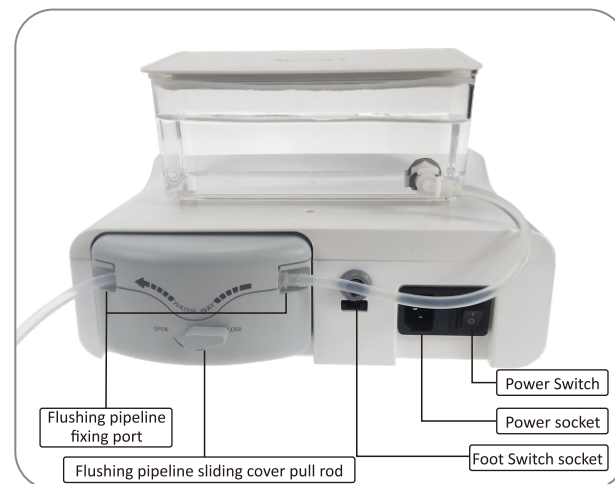
Rated working voltage	DC32V
Operating Mode	Forward/reverse rotation
Standard Mode Speed Range	100rpm@40,000 rpm
Maximum torque of motor	Greater than 1 N · cm
Cooling gas flow	≤40L/min
The maximum illumination	≥7000lux
Dimensions	Diameter Φ21.7mm×height 70.5mm

### 3. Gas and water supply

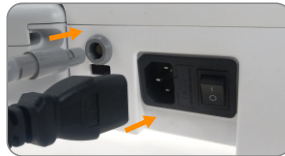
Cooling water flow at 100%	Above 50 mL/min
Spray gas supply	Above 1.5 L/min
Water quality and hardness range	Hardness of distilled/purified water <6.5mmol/L
Recommended cooling fluid	Distilled water/purified water
Max. allowable suspension load	≤1.5KG

### 4. Structure and assembly

Dental low-voltage electric motor is composed of main engine, water tank, brushless direct-current motor (including pipeline) and foot Switch.



#### Installation instruction



As shown in the figure, plug in power cord.  
Insert the pedal interface into the corresponding insertion port of the main engine.

**⚠ Caution**  
When the pedal is connected to the main engine, please note that the insertion should not be loose.

#### ⚠ Caution

- Do not use power cables other than our accessories, and can only connect to grounded sockets.
- Please confirm the water quality of the water tank before use. Do not use water with impurities, which may block up the motor or handpiece.
- Do not use the above force to pull the motor wire, which may cause loosening or damage.
- Do not use it outside of the recommended environment.



Insert the support bar.

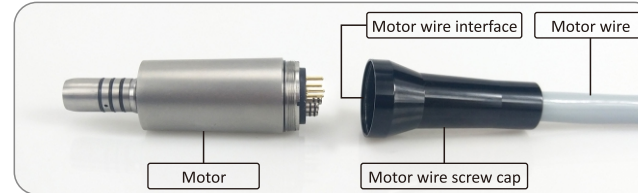
**⚠ Caution**  
Please pay attention to bayonet position.  
(Max.hanging weight is 1.5KG)



Open the pump cover and cover with the disposable water supply pipe.  
Then Close the water pump pressure cover.

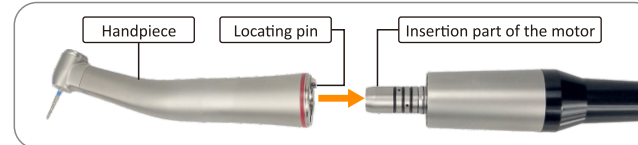
#### Loading and unloading of motor/motor wire

As shown in the figure, carefully align the gap between the motor and the motor wire connector, and insert it slightly until they stop. Then tighten the motor wire nut. When disassembling, loosen the nut of the motor wire and pull it straight out.



#### Loading and unloading of motor/ handpiece

Insert the handpiece into the insertion part of the motor and rotate it until you hear a "click" that coincides with the anchor point. To remove when unloading, hold the motor and handpiece tightly and pull straight out. When inserting the handpiece, properly insert the locating pin to avoid abnormal rotation.



#### ⚠ Caution

- Do not fuel the motor (lubricated for long-term use).
- Be careful to use the grease-filled handpiece accessories (E interface). Put the handpiece vertically until the excess cleaning oil is exhausted. Wipe the handpiece clean and connect to the motor at the rear.
- Do not install or remove the handpiece with the motor turning.
- Be careful not to the oily handpiece to the motor to prevent oil from flowing into the motor and causing motor failure.
- Save the handpiece separately and install it when use.
- Do not bring water into the motor to avoid causing failure.
- The motor is up to 55°C.

# USING INSTRUCTIONS

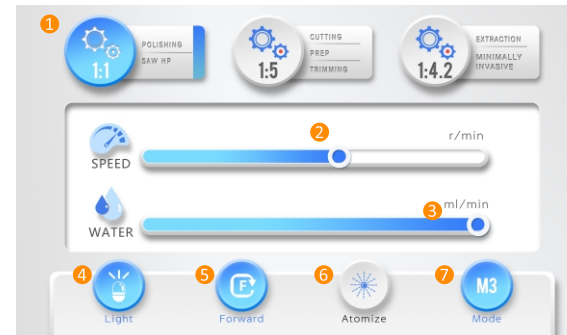
## 1.Super Micro S Plus操作界面



**注意:**

出于安全考虑,在设置数据状态下,踩下脚踏板无法启动马达,需退出设置状态后方可正常启动马达。

## 2.Touch panel operation interface




- ① Switch speed ratio: 1:5, 1:1, 1:4.2.
- ② The speed slider, adjust speed by dragging left and right.
- ③ The water slider, adjust water flow by dragging left and right.
- ④ Light button, turn on/off the LED light.
- ⑤ Switch the rotation direction: Forward / Reverse
- ⑥ Atomize button
- ⑦ Modes switching button: M1, M2, M3

## 3.Usage method

- 1) Plug in the power wire, turn on the power supply, and light up the display screen of the main engine.
- 2) Please select the speed ratio icon of the handpiece that you want to use.




*When the speed is set, the background light of the selected speed ratio icon will light up. For details of the display, please refer to the table below.*

Transmission ratio	Display values
1:1	100~40,000r/min
1:4.2	420~168,000r/min
1:5	500~200,000r/min

- 3) Drag the speed adjustment progress bar left and right on the display screen, and the rotation speed of the handpiece will be displayed in numbers on the screen. Drag to the left to reduce the speed and drag to the right to increase the speed.
- 4) Drag the water volume adjustment progress bar left and right on the display screen, and the water supply will be displayed on the screen in a digital percentage. Drag the left to reduce the water volume, and drag the right to increase the water volume. The water volume adjustment range is 10-100%, and the step amount is 10%, which is divided into 10 levels.
- 5) Light adjustment of brushless direct-current motor  
On/off: Click the LED icon to control the brushless direct-current motor to be on/off.
- 6) Forward and reverse rotation  
Clicking the forward/reverse rotation icon  will change the direction of operation of the brushless direct-current motor.
- 7) Atomizing water switch On/Off  
Click the atomization icon to control atomized water to be on/off.
- 8) Program reading and writing Read  
Click the read and write setting icon once to enter the recently stored setting program; click again to enter the next setting program; 3 programs can be stored; switch one per click; click the fourth time to start the cycle.

*Write: Press and hold the read-write setting icon for 3 seconds and when hearing a beep, write the parameters set on the current screen. (The upper left corner showing the program memory bit number)*

#### Using a foot switch

-  water pump on/off (Green button)  
Press the water source key of the foot pedal switch to turn on or off the water pump and the atomizing pump. The function is equivalent to the LCD spray water switch.
  -  switching program 1:1, 1:5, 1:4.2 (Orange button)  
Tread and trample conversion button, and the speed ratio switch realize the switching of three speed ratios (1:1, 1:4.2, and 1:5)
  -  Switching Forward/Reverse rotation (Yellow button)  
Press the forward/reverse rotation switch button in order to switch between the forward and reverse rotation modes of the motor.
- Middle big pedal—stepless speed change  
The speed of the motor increases or decreases as the foot pedal is depressed. The pedal motor can only work if the foot switch is pressed.

# FACTORY SETTINGS

## 1. Default factory settings:

Default transmission ratio	1:5
Default rotation rate (r/min)	120,000
Default motor rotation direction	Forward
Default water volume	80%(On)
Default atomizing air pump	On
Default LED light	On

## 2. P4-P5 Modes

Default storage program	M1	M2	M3
Transmission ratio	1:1	1:4.2	1:5
Rotation speed (r/min)	20,000	100,800	120,000
Motor rotation direction	Forward	Forward	Forward
Water quantity	80%	80%	80%
Atomizing air pump	On	Off	On
LED light	On	On	On

# TROUBLE SHOOTING



Failure Code	Description	Solution
E1	Voltage over-voltage/under-voltage	1. Disconnect the power switch. 2. Check whether the power supply voltage is within the range of 198V-242VAC. 3. Turn on the power switch again after confirmation.
E2	Foot pedal control error	Turn off the power supply of the equipment, check the plug connection of the foot pedal part, and restart it
E3	Motor phase missing / shortcircuit	Check whether motor connection is in good condition, and power on again after connection.
E4	Motor blocking / overloading	Power on again after eliminating the cause of locked rotor.

If there is any problem, please check it again before sending it for repair. If it does not comply with any of the above conditions or there is no improvement after inspection, please contact the seller. If external conditions cause an overall failure of the device, it must be switched off and then restarted.

# CLEANING, STERILIZATION, MAINTENANCE & STORAGE



## 1. Cleaning, disinfection and sterilization

Cleaning, disinfection and sterilization process after use:

Process	Phase	Relevant	Requirements	Note
Whole process	Whole process	Whole process	Wear protective clothing.	
On-site preparation after use	Removal of contamination	Removal of total fouling	1. Please turn off the power supply. 2. Remove the motor from the motor wire. Loading and Unloading of Motor Wires) 3. After each use, use wet tissues for preliminary cleaning in time to remove obvious dirt. Screw the pipe handle cover into the motor wire connection, and install the end cap of guide sleeve to the insertion part of the motor 4. After removing obvious fouling, put it into special tray and send it to cleaning room in time.	Only wet tissues with no protein stabilization can be used.
	Preparation for transportation	Safe transportation of containers	The motor (with end cap of guide sleeve and tube handle cover) is transported in a tray to prevent falling and protect health care personnel.	
Prepare for cleaning	Preparation	Tool preparation	Prepare brushes, cotton swabs, absorbent cloths and rigid sterilization containers with vent holes.	
Clean	Manual cleaning	Remove stains	1. Rinse with softened water (<38°C) and brush first, and clean the product to be sterilized with absorbent cloth. a. Surface Cleaning: Rotate the motor to clean the surface and remove any liquid residues with an absorbent cloth or brush until visually clean. b. Clearance and contact parts cleaning: The gap and the motor tail are connected to the gap. Brush it back and forth repeatedly with a brush until there is no stain residue visually, and then	When flushing, the motor connection port is facing down to avoid water from flowing into the motor. Do not place the motor immersed in a liquid or in an

Clean	Manual cleaning	Remove stains	<p>wipe them with an absorbent cloth.</p> <p>c. The handpiece bracket directly rinses off the visible stains and wipe them with an absorbent cloth.</p> <p>d. Put the used wipes and gloves in the medical waste collection box and replace them with new ones.</p> <p>2. Use enzyme cleaning agent and absorbent cloth to wipe and clean the motor (with end cap of guide sleeve and tube handle cover) and handpiece bracket which have been cleaned in the first step to ensure that all gaps and accessible surfaces are cleaned by wiping.</p> <p>3. Pay attention to the gap and groove, and press the rotary wipe with a cotton swab stained with enzyme cleaner to clean these areas until no stain residue can be seen on the swab.</p> <p>4. Rinse again with softened water (&lt;38°C) and brush.</p> <p>5. Use sterile cloth with strong water absorption to blot up and place it for a period of time to dry naturally.</p> <p>6. If necessary, repeat the above actions until the product to be sterilized is thoroughly cleaned and no visible stains are present</p>	ultrasonic cleaner If the operator's vision is defective, it is recommended to wear suitable glasses when observing residual stains. Please observe the residue of stains in a bright environment.	
Disinfection			Wear medical gloves and pour 75% of the medical alcohol over an absorbent cloth, wipe the surface of motor (with end cap of guide sleeve and tube handle cover) for 3 times, each time for 20 seconds at room temperature of 20~30°C, place it for one minute after wiping to wait for alcohol to volatilize, and make visual inspection until there is no liquid through visual inspection.		
Drying			Dry with pressure air gun or sterilized low-fiber catkin wipe until there is no liquid residue through visual inspection.		
Packaging	Packaging		Put the motor (with end cap of guide sleeve and tube handle cover) and handpiece bracket into autoclaving bags respectively and seal them. Only one set of motor (with end cap of guide sleeve and tube handle cover) or handpiece bracket is placed in one sterilization bag.	Sterilization pouches should comply with ISO 11607-1: 2006.	
Sterilization	Damp heat	Sterilization phase	<p>1. Perform high-temperature and high-pressure sterilization by pre-vacuum procedure according to the following method: (YY 0836-2011 standards stipulate that the durability can be sterilized at least 250 times. When using delicate motors and motor cables, it is recommended that maintenance was performed after 250 sterilization rounds or regularly once a year)</p> <p>2. Timely clean and sterilize within the same day after use;</p> <p>3. At 134°C and 220kPa, sterilize at high temperature and high pressure for no less than 3 minutes;</p> <p>4. It is recommended that the sterilization load should not exceed ten sets at a time, and it should be tiled in the sterilizer without stacking.</p>	The user should establish the records and identification of sterilization times and date in accordance with the instructions, standards and principles of the country (region). Brushless motor wires cannot be sterilized at high temperature.	

Storage		Storage	<p>1. It is suggested that the sterilized articles should be stored in the storage rack or storage cabinet in the storage room of sterile items, which should be easy to be cleaned and not prone to rust; The preservation environment should be clean, bright, ventilated or with air purification device, with sufficient lighting; the temperature should be -40°C~+55°C, the humidity being 8% RH~93% RH, and the air pressure being 500hPa~1060hPa.</p> <p>2. Sterilized items should be stored by classification, in a relatively fixed storage position with clear identification.</p> <p>3. After sterilization, the storage, marking and expiration date should comply with the instructions, standards and principles of the country (region), and please follow the regulations of the hospital and clinic.</p>	Please operate in accordance with the instructions, standards and principles of the country (region).
Transport	Transfer	Place of delivery	Use the designated transport equipment to transfer as required.	Please operate in accordance with the instructions, standards and principles of the country (region).

## 2. Sterilization instructions

Only the motor can be sterilized. The company recommends using autoclaves for sterilization. At initial use, or after the end of treatment for each patient, please follow 6.1 cleaning, disinfection and sterilization sterilize by high temperature.

Parts that can be sterilized by high temperature and high pressure: motor, end cap of guide sleeve, tube handle cover.

Always put in an autoclaving bag before use.

And keep it in a place in a clean condition.

\* 134 °C recommended by EN13060 or ENISO17665-1 should not be less than 3 minutes



### Caution

- Do not conduct high-temperature high-pressure sterilization (or all high-temperature sterilization) on control components, adapters and motor body components.
- Do not inject oil into the motor.
- Do not use oxidizing potential water (strong acid water, super acid water) or sterilization solution for cleaning, dipping and wiping the equipment, otherwise, it may cause discoloration of plastic parts or corrosion of metal parts.
- If the surface is sterilized with fouling, rust may occur.
- When the O-ring of the motor head falls off, please replace it with a new O-ring (for protecting the motor) to avoid water enter the motor and cause failure.

\* O-ring (for protecting the motor)

### 3. Maintenance

Replace the O-ring due to deterioration of the O-ring, which will make it difficult to install the handpiece accurately or cause water and air leakage.

#### Replace O-ring :

Remove the deteriorated O-ring at the insertion part of the motor with a needle, etc., and insert the new O-ring into the O-ring clamping groove.

O-ring (black): Product No. 315020



#### Caution

- There are three O-rings in total.
- If the O-ring deteriorates, the following phenomena may occur:  
Water leakage, no effluent water  
Air leakage, no ventilation  
Shock  
Difficulty of installing handpiece accurately

### 4. After-sales service

This product has undergone strict quality management and pre-sale inspection, in order to make you more assured when using, the warranty certificate and warranty registration card are attached specially. If you complete the setup without any problems, please fill in the necessary information on the warranty registration card and send it to us. If the warranty registration card is not sent, it will be paid for repair even during the warranty period. In addition, please keep the warranty letter properly after filling in the specified contents. This product cannot be repaired on site. If there is any problem, please contact the seller.

### 5. Disposal of waste products

Our company attaches special importance to the responsibility of environmental protection, and the design of dental low-voltage electric motor equipment and its packaging should be as environmentally friendly as possible.



Waste disposal of dental low-voltage electric motor control boards, drive boards and brushless direct-current motors. Dispose of old electrical equipment in accordance with the principles, standards and requirements of your country (region).

Ensure that the spare parts are not contaminated during waste disposal.



Waste disposal of packaging materials

All packaging materials are selected according to environmental protection standards, which can be recycled. Please send the old packaging materials to the relevant collection and reprocessing system. In this way, you contribute to the recycling of raw materials, thus avoiding waste.

### 5. Guarantee

From the date of your purchase, the manufacturer will guarantee the quality of the product for a period of one year provided that it is used according to the methods and procedures described in this instruction manual.

However, please note that you are not guaranteed if you do not comply with the contents in this instruction manual or the use method of disposable parts.

### 6. EMC information (Electromagnetic compatibility information)

- (Dental low-voltage electric motor) should comply with the relevant requirements of electromagnetic compatibility in Standard YY0505-2012.
- The user should install and use the EMC information provided in the random file.
- Portable and mobile RF communication equipment may affect the performance of (dental low-voltage electric motors) and avoid strong electromagnetic interference when used, such as proximity to handpiece, microwave ovens, etc.;
- The guidelines and manufacturer statements are detailed in the attachment.



#### Caution

- (Dental low-voltage electric motor) should not be used close to or stacked with other equipment. If it must be close or stacked, it should be observed and verified that it can operate normally in the configuration in which it is used.
- Except the transducers and cables sold by the manufacturer of (dental low-voltage electric motor) as spare parts of internal components, the use of accessories, transducers and cables other than those specified may lead to the increase of emission or the decrease of noise immunity.

# SYMBOL DESCRIPTION



## Symbol description on operating instruction:



Disposal of waste products and accessories in accordance with the "Scrapped Electronic and Electrical Equipment (WEEE) directive (2012/19/EU)"



II instruments



Foot pedal



On



The fuse



Warning and caution



Off



The max. temperature of autoclaving can reach 135 °C



Protective earthing



Type B applied Part

Logo Description On The Package



Upward



Avoid get wet in the rain




Fragile, handle with care

## Attachment:

Guidance and Manufacturer's Declaration - Electromagnetic Emissions			
The purchaser or user of (dental low-voltage electric motor) should ensure that it is used in the electromagnetic environment specified below:			
Emission test	Compliance	Electromagnetic Environment - Guidelines	
GB4824 RF emission	Group 1	(Dental low-voltage electric motor) uses RF energy only for its internal function. Therefore, its RF emissions are low and may not cause any interference in nearby electronic equipment.	
GB4824 RF emission		(Dental low-voltage electric motor) is suitable for use in all installations including domestic and direct connection to the domestic public low voltage supply network for domestic use.	
GB17625.1 Harmonic emission			
GB17625.2 voltage fluctuation/ flicker emission			

Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
The purchaser or user of (Dental low-voltage electric motor) is intended for use in the electromagnetic environment specified below, and the purchaser or user of (Dental low-voltage electric motor) should ensure that it is used in this electromagnetic environment:			
Immunity test	IEC 60601 Test Level	Compliance level	Electromagnetic Environment – Guidance
Electrostatic Discharge (ESD) GB/T 17626.2	± 6kV contact discharge ± 8kV air discharge	± 6kV contact discharge ± 8kV air discharge	The ground should be wood, concrete or ceramic tiles, and if covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient pulse group GB/T 17626.4	± 2kV to power wire	± 2kVto power wire	Grid power should be of quality typical in commercial or hospital settings.
Surge GB/T 17626.5	± 1kV wire-to-wire ± 2kV wire to ground	± 1kV wire-to-wire ± 2kV wire to ground	Grid power should be of quality typical in commercial or hospital settings.

Voltage sag, short-term interruption and voltage change on the input line GB/T 17626.11	<5% U <sub>i</sub> lasting for 0.5 week (>95% dipping on U <sub>i</sub> ) 40% U <sub>i</sub> lasting for 5 weeks (60% dipping on U <sub>i</sub> ) 70% U <sub>i</sub> lasting for 25 weeks (30% dipping on U <sub>i</sub> ) <5% U <sub>i</sub> lasting for 5s (>95% dipping on U <sub>i</sub> )	<5% U <sub>i</sub> lasting for 0.5 weeks (>95% dipping on U <sub>i</sub> ) 40% U <sub>i</sub> lasting for 5 weeks (60% dipping on U <sub>i</sub> ) 70% U <sub>i</sub> lasting for 25 weeks (30% dipping on U <sub>i</sub> ) <5% U <sub>i</sub> lasting for 5s (>95% dipping on U <sub>i</sub> )	Grid power should be of quality typical in commercial or hospital settings. If the user of the (dental low-voltage electric motor) requires continuous operation during a power outage, and it is recommended that the (dental low-voltage electric motor) should be powered from an uninterruptible power supply or battery.
Power frequency magnetic field (50/60Hz) GB/T 17626.8	3A/m	3A/m, 50Hz/60Hz	The power frequency magnetic field should have the horizontal characteristics of power frequency magnetic field in typical places in typical commercial or hospital environment
Note: UT refers to alternating-current network voltage before test voltage is applied			
Rf conduction GB/T 17626.6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should not be used closer than the recommended separation distance to any part, including cables. This distance should be calculated by a formula corresponding to the frequency of the transmitter. Recommended separation distance $d = 1.2\sqrt{P}$ $d = \sqrt{80 \text{ MHz to } 800 \text{ MHz}}$ $d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz P in Watts (W), d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters are determined by surveying the electromagnetic site and should be lower than the compliance level in each frequency range. Interference may occur near equipment marked with the following symbols. 
Rf radiation GB/T 17626.3	3 V/m 80 MHz to 2.5 GHz	3 Vm	
Recommended separation distances between portable and mobile RF communication equipment and (Dental low-voltage electric motor)			
Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
Recommended separation distances between portable and mobile RF communication equipment and (Dental low-voltage electric motor)			

Rated maximum output power/W of the transmitter.	Isolation distance corresponding to different frequencies of the transmitter/m		
	150 kHz ~ 80 MHz $d = 1.2\sqrt{P}$	80 MHz ~ 800 MHz $d = 1.2\sqrt{P}$	800 MHz ~ 2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
<p>For rated maximum output power of transmitters not listed in the table above, the recommended separation distance d, in meters (m), can be determined by the formula in the corresponding transmitter frequency column, where P is the maximum output rated power of the transmitter provided by the transmitter manufacturer in watts (W).</p> <p>Note 1: At the frequency of 80MHz and 800MHz, the formula for the higher frequency range is used.</p> <p>Note 2: These guidance may not be applicable in all cases where electromagnetic propagation is affected by absorption and reflection by buildings, objects and human bodies.</p>			

## Storage and transportation

1. The device should be handled with care to avoid vibration. The installation and storage environment should be dry and cool. Storage and transportation temperature is -40°C~+55°C; humidity during storage being 8%RH~93%RH, and air pressure being 500hPa~1060hPa.
2. Working temperature is 5°C~40°C; working humidity being 15%RH~80% RH, and barometric pressure being 860hPa~1060hPa.
3. Avoid placing with toxic, corrosive, volatile, inflammable and explosive objects.
4. Avoid vibration and impact during transportation and place it carefully.

## Inspection and replacement cycle of consumables

Maintenance of functions and safety must be carried out on a regular basis and at least every three years (unless a shorter inspection period is prescribed by law). This inspection must be performed by a qualified professional organization and must include the following procedures:

- Visually detect whether the external surface of the device is damaged.
- Measure whether the equipment has leakage current.
- Visually check whether there is safety problem on internal parts.  
*For example, mechanical damage to the enclosure or indication of overheating.*
- Carry out a functional test to check whether the maximum speed can be reached.
- It is suggested that only authorized Plus Power service partners can carry out service and overhaul.

## Circuit connection diagram

