Fiber Optic Brushless Electric Micromotor Set

Operation manual

1.Description of Products

This product is a comprehensive control equipment of dental electric motor, utilizing precise electric motor as the primary drive source with LED of high brightness as light source. This product has the following features: Free of regular maintenance, micro-vibration and low noise, ease of operation, and easy to use. Simply connected with standard four-hole connector, you can use the original air-powered control system with different speed-increasing and decreasing handpiece to complete most of the clinical therapy.

2·Technical Data

Brushless electric motor

- Maximum speed：40000±10%(RPM)
- Minimum speed：2000±10%(RPM)
- Maximum torque：3 Ncm
- Size：50 mm
- Weight：87g

Motor control box

- Voltage：32V DC
- Maximum power input：120 W/VA
  (in accordance with IEC60601-1-2 related code of electromagnetic compatibility)
- Electric insulation class：Class I equipment type B applied part
- Protection class IP X class 1
  (no damage caused when water drip fallen vertically)
- Size：150mm X 125mm X 56mm
- Weight：500g

Working condition：
- Temperature：10℃ - 40℃
- Relative humidity：30% - 80%
- Atmospheric pressure：700hPa - 1060hPa

Transportation and storage condition：
- Temperature：-18℃ - 70℃
- Relative humidity：10% - 100%
- Atmospheric pressure：500hPa - 1060hPa

AC adapter

- Manufacturer and model number：Protek power / PMP135-16
- Input Voltage：100 - 240V AC
- Input frequency：50 - 60 Hz
- Input electric current：1.6A (rms) for 110V AC · 0.8A (rms) for 240V AC
- Output power：Max 135W
- Output Voltage：32V DC
- Output Current：4.5A
- Size：171mm X 72mm X 42mm

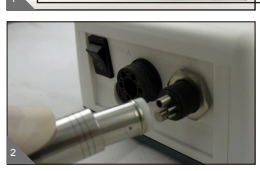
Working condition：
- Working temperature：0℃ - 60℃
- Storage temperature：-40℃ - 85℃
- Relative humidity：5% - 95% (no vapor condensation)

3·Product Assembly

CAUTION
Please read this Operation Manual carefully before assembly and file for future reference.
Turn off water and mainframe power, before assembly and then turn on device after installation finished In order to comply with EU EC60601-1-2 regulation，please be sure all wires that have to be connected to device carefully and install well. Please follow all instruction to ensure products under warranty.

SET UP CONTROL BOX
STEP1：Illustration for connecting control box

Turbine hose connector
Motor cord connector
AC adapter connector
Power switch



STEP2：Illustration for connecting turbine hose connector
Be sure there is no air or water coming from turbine hose when connecting. Fit the turbine hose plug of the delivery unit to the turbine hose connector piping and tighten completely. Rotate in counterclockwise direction. After hearing clicking sound, screw the nut properly with suitable force in clockwise direction, shown as Fig.3.

3·Product Assembly

Finishing the connection of turbine hose connector。

STEP3：Illustration for connecting motor cord and control box
Be sure there is no air or water coming from turbine hose when connecting. Fit the motor cord plug of the delivery unit to the motor connector piping and insert firmly. Rotate in counterclockwise direction. After hearing clicking sound, screw the nut properly with suitable force in clockwise direction completely, shown as Fig.5.

Finishing the connection of motor cord and control box。

3·Product Assembly

STEP4：Illustration for connecting AC adapter
Insert the AC adapter plug into the AC adapter connector, after hearing clicking sound as shown in Fig. 7.

Finishing the connection of AC adapter

STEP5：Illustration for connecting / disconnecting the motor and the motor cord
Align the pins of motor cord connector into the pin holes of the motor firmly, foolproof design as Fig.8shown。

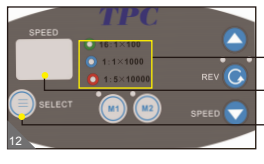
3·Product Assembly

Rotate in counterclockwise direction. After hearing clicking sound, screw the nut properly with suitable force in clockwise direction completely, shown as Fig.9shown.

Finishing the connection of motor and motor cord

STEP6：Finishing the power cord
Insert the power cord plug into the inlet of AC adapter completely,

4.Operation Instructions



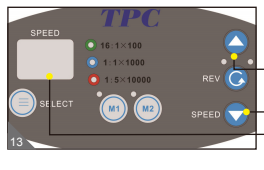
STEP1： Setting the speed range

Type of handpiece
Digital display unit: RPM
Selection button for different types of handpieces

Handpiece Gear Ratio	Indicator of SPEED	Speed range (rpm)
16:1	01~25	100~2500
1:1	02~40	2000~40000
1:5	01~20	10000~200000

Push the SELECT switch to adjust the type of handpiece

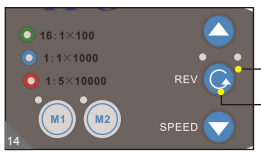
* The SELECT button is functional only by the motor in static condition



STEP2：Speed Control Switches
Set the speed of the motor.

The button for acceleration
The button for deceleration
Digital display unit: RPM

4.Operation Instructions

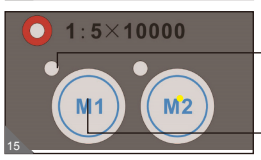


14

STEP3： Select Rotation for Forward / Reverse

Indication lamp of rotation direction

Selection button



15

STEP4： Instruction of memory setting

Press the button of M1 or M2 at least 5 seconds until it beeps to memorize the current setting for current record.

* The reaction triggers after push the button of select only when motor is still.

Light for showing the selected model

Button of Memory


16

STEP5：Instruction of foot air pedal of delivery system

After all settings completed, step the foot air pedal to delivery the air into control box.

5.NOTICE

1.Brushless electric motor applied to dental handpieces in accordance to ISO3964-1982(E).

2.Be careful with handpiece hose avoiding any twist or break.

3.Water and air input shall comply with required quality standards.

4.After long-term use, please clean the control box by soft cloth to keep it free from pollution and surface erosion by chemical solvents.

5.Be cautioned the device is forbidden to run in the conditions of existing flammable anesthetics, oxygen or nitrous oxide mixture gases.

6.Before using, please check adapter plug connected, and whether the power indicator light is on.

7.Motor should be sterilized in an autoclave before each treatment.

8.The device running may interfere with the cardiac pacemaker. If you have any questions with the patient having heart pacemaker, please consult cardiologists.

9. Please do not put off or touch power plug for fear of accidents or device breaking down.

6.Troubleshooting

Error Code

If the motor stops due to an breakdown such as a malfunction, overload, break or wrong use, it would automatically check the state of the control unit and detects the cause and displays an error code on the speed indicator. If an error code is displayed, please turn on the power again and check whether the same error code is displayed. If the same error code is displayed, please take action by referring to the instructions provided in the column of “Check/Remedy” in the following table.

Error Code	Trouble	Causes	Check/Remedy
E0	Overcurrent Error	Motor overload.	Restart. If ineffective, please contact your dealer.
E1	Overheat Error	High temperature sate system is functioning, due to long-time usage at a high load.	Cool it down for a while, and try again.
E2	Inrush current Error	Detected inrush current.	Restart. If ineffective, please contact your dealer.
E3	Bulb voltage Error	Overvoltage is given from the internal circuit.	Restart. If ineffective, please contact your dealer.
E4	Motor start Error	•Motor didn’t reach the preset speed in a prescribed period of time. •Motor cord wire break down or internal circuit malfunction.	Restart. If ineffective, please contact your dealer.
E5	Overvoltage Input Error	Overvoltage is given to the control box.	Restart. If ineffective, please contact your dealer.

Troubleshooting

If the motor stops due to an breakdown such as a malfunction, overload, break or wrong use, it would automatically check the state of the control unit and detects the cause and displays an error code on the speed indicator. If an error code is displayed, please turn on the power again and check whether the same error code is displayed. If the same error code is displayed, please take action by referring to the instructions provided in the column of “Check/Remedy” in the following table.

Error Code	Causes	Solution
Pilot Lamp does not light	Power Switch is OFF.	Turn On Power Switch.
	Power Plug is not connected correctly.	Check the connection.
	Internal Fuse is blown, due to some reason.	Contact your dealer.
Motor does not run	Tubing, Motor cord, driver module is not connected correctly.	Check the connection
	Air pressure is not given, or not properly from the delivery unit.	Check the air pressure of the delivery system.
	Check the ERROR CODE in the Speed indicator.	Refer to ERROR CODE.

7.Maintenance

Overhaul

Do not disassemble the product, for all Adjustment and maintenance, it is recommended that you contact directly with your dealers. Requires users to overhaul the used equipment at least once a year.

Application

This product must to be used by the qualified personnel for dental treatment only.

Information

All technical specification, diagram and size in this manual are only for reference, and shall not be used as the basis for any claim. The manufacturer for compensation technical specification is subject to revise without notice.

Clean

·Use a clean, moist cloth to disinfect.
·Do not press the light source.
·Do not use product which containing acetone, chlorine and bleach as a disinfectant.
·Do not immerse in the liquor.
·Do not use in the ultrasonic cleaner.

Sterilization

·Autoclave sterilization is recommended.
·Autoclave sterilization is required for the first time use and after each patient as below notes.

CAUTION : Do not autoclave (or any other high temperature sterilization) Control Box, Driver module and Motor Cord.

Saving

1.Turn off the power.
2.Remove the motor from the Motor Cord and Handpiece.
3.Clean the surface of Motor with brush, and wipe it with cotton moistened with disinfecting alcohol.
4.Place the Motor in autoclave pouch. Seal the pouch.
5.Autoclavable up to max. 135oC and 3-minute sterilization.
6.keep the motor in the autoclave pouch to keep it clean until you use it.

8.General Principles and warranty.

General Principles

The product should only be performed by the qualified personnel in accordance with the existing relevant industrial safety, health and accident prevention, as well as the provisions of this job description. According to the above requirements, the operator:

·Use only perfect performance fault-free products: When the occurrence of abnormal operation, excessive vibration, overheating or other failure of signs, shall immediately stop working and contact Codent or its authorized repaired center.

·Must ensure that the device only for its design purpose, and shall ensure that its own patients and other people's safety,the process of use should avoid pollution. The device can only be used for the purpose of dental treatment; prohibit this product from other purposes, otherwise it will be dangerous. The medical devices conform with the equirements of all existing EU law.

Do not use in the place which containing explosive gas (anesthetic gas).
Do not immerse in the disinfectants liquor.
This device is intended for recycling. Electrical and electric equipment may contain dangerous substances with harmful impact on health and the environment. The user is required to recover such equipment to distributor or recyclable such equipment directly to authorized personnel (EU Directive 2002/96/CE).

Warranty

Warrants its products to the original purchaser against defects in material and workmanship under normal practices of installation use and servicing, The warranty time is 12 months from the invoice date of purchase. If claims proved or its authorized agent has the obligations to provide free repair or replace of the product. Any other reasons for the claim, especially due to factors such as destruction or interests, are not covered under warranty.

Is not responsible for damage or problem caused by the following factors

·Excessive operation.

·Incorrect operation.

·Without following the manual instruction to install, operate, and maintain.

·Influenced by the unusual chemical, electrical or electrolyte substance.

·Gas, water or electricity tube are mistakenly connected.

The “fiber optical” and any parts made from synthetic material are not under warranty, if the damage or the subsequent impact are caused due to incorrect operation or adjustment, the warranty term will be immediately invalidated. In order to meet the warranty and compensation term, any returned products must be indicated with the date of purchase, product type, invoices or shipping records .

9.Warnings

Prevention measures for medical device and ElectroMagnetic Compatibility (EMC)

It must be in accordance with the user manual and the existing file of electromagnetic compatibility information for installation and using.

This product complies with IEC60601-1-2 of the EU on the provisions of the letter of the electromagnetic compatibility. It is forbidden to use radio transmitting equipment, mobile phones nearby the device, so as not to affect the performance of the instrument, specific precautions needs to be taken when using strong wave of radiation sources, such as high-frequency surgical equipment and similar equipment if example, is not available in the instrument winding high-frequency near the pipeline. If there is any question,please contact a qualified technician.

This product can not be closed to other equipment or stacked with other equipment. If it must be closed to or stacked using, please to set up and operate in a normal manner to the way they should be used.

Concerning replacement parts for internal components, accessories, transformers and hose fails to specify the manner or the adapter and tubing will increase the amount of radiation waves or reduce the tolerance of this commodity.

Guidelines and manufacturer's declaration - electromagnetic emission waves

this product is intended for using in the electromagnetic environment.
Customers who use the product should ensure that operating environment meet standard condition.

Emissions test	Accordance	Electromagnetic environment standards
RF Emissions CISPR11	Group 1	This product which uses radio frequency energy for internal purposes only operation. Radio frequency (RF) radiation waves is quite low, and should not interfere with nearby electronic equipment.
RF Emissions CISPR11	Class B	This product is applicable to all facilities, including household facilities, as well as directly connected to the public low-voltage power supply network, for general building household power supply facilities.
Harmonic Emissions IEC61000-3-2	Class A	
Voltage fluctuation / flicker radiation wavelEC61000-3-2	Section 5	

10.Warnings

Guidelines and manufacturer's declaration - electromagnetic tolerance

This product can be used for the following specific electromagnetic environment.
Customers or users of this product should ensure that operating in an appropriate environment.

Immunity test	IEC60601Test level	Compliance Level	Electromagnetic Environment - Guidance
Electrostatic discharge(ESD) IEC61000-4-2	±6KV · ground ±4KV · contact ±2KV · contact ±8KV · air ±4KV · air ±2KV · air		Floors must be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast / instant Burst IEC61000-4-4	±2KV · Powered supply line ±1KV · Applicable Input / output line		Main power quality should be at the same level with the location of the general commercial or hospital environment.
Surge wave IEC61000-4-5	±0.5KV · Tubing on tubing ±1KV · Tubing on tubing ±0.5KV · Tubing on ground ±1KV · Tubing on ground ±2KV · Tubing on ground		Main power quality should be at the same level with the location of the general commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on the power supply input tubing IEC61000-4-11	< 5% UT(> 95% dips · at UT)Around 0.5 circles 40% UT(60% dips · at UT)Around 5 circles 70% UT(30% dips · at UT)Around 25ciercles < 5% UT(> 95% dips · at UT)Around 5 seconds		Power voltage should meet the level of the general public or hospital environment.The users of this product during the main power supply is interrupted continue operation of the proposed use of the supply of continuous electrical device- oriented products.
Power currency (50/60Hz) Magnetic filed IEC61000-4-8	3 A/m		Power frequency magnetic fields should be at the same level with the location of the general commercial or hospital environment.