

Maxso[®] E600P

Electric Micromotor System

Instruction for Use



Beyes[®]




Operation Manual

- Equipment Classification
 - Class II equipment: 
 - Type B shock protection: 
 - Recommended sterilization: See 7. Sterilization
 - Do not use in the presence of flammable liquids or gases.

Cautions for safe handling and operation

Read these safety precautions first before using this product.

These instructions will show you how to operate this product safely and prevent injury to yourself or others. They are classified by the degree and/or severity of danger. All cautions regarding safety should be observed.

Classification	Degree and severity of danger
 Warning	Provides an instruction where personal injury may occur.
 Caution	Provides an instruction where minor to medium injury may occur.
 Notice	Provides an instruction that should be observed for safety reasons.

Warning

- To Prevent Electric Shock: Do not plug in the power cord with wet hands.
- To Prevent Electric Shock: Prevent water from getting on to the control box.
- To Prevent Electric Shock: Plug in and remove the power by holding on to the base of the plug and not the cord.
- To Prevent Electric Shock: Use an electrical outlet which is grounded.
- If you feel any abnormality such as excessive vibration, heat, or noise, stop using the unit immediately.

Caution

- When operating this system, always consider the safety of the patient.
- The product is designed for clinical dental use by qualified personnel
- Every connection must be firm. If it is not firmly connected, it may cause an air or water leak, or the LED might not turn on.
- Do not drop the product or cause it to be impacted in any way. This could cause a malfunction and damage.
- This system is to be used with ISO 9168, type B or type C hose connector.
- This system is meant to function in temperatures of 0-40°C (32-104°F), humidity at 10-85% RH, atmospheric pressure 700-1060hPa and no moisture or condensation in the Control Unit. Operating outside of these parameters can cause a malfunction.
- When installing the Control Box or Motor, do not bend or twist the tubing or the cord. No excessive force is needed to do the installation.
- Do not use contaminated air (by dust or moisture). If the air contains water or dust, it might cause a malfunction or overheating.

 **Caution**

Unit

- Grasp cord by the plug to remove from the outlet. Do not pull or yank the cord itself. It may cause the wire to malfunction.
- Care should be taken not to place the AC cord near a gas burner. Never attempt to repair a burned motor cord. Always replace it with a new cord.
- Prior to use, always check for vibration, noise and overheating. If any abnormalities are detected, stop using immediately and contact your dealer.
- Be careful not to spill water onto the unit as it may result in a fire or an electric shock due to a short circuit.

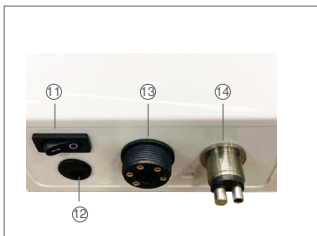
Motor, Hand piece

- Do not use this product under strong stress for extended periods of time. It can cause overheating.
- Do not connect or disconnect the cord until the drive motor has completely stopped.
- Do not connect/disconnect the hand piece during operation.
- Verify that the Speed Control Switch is adjusted within the allowable speed before use.
- Connect only 4-hole, 5-hole or 6-pin tubing.
- Air Requirements: Dry, free from contamination and oil. Use a compressor with a dry air system/ Install an air filter if necessary/ Blow out the lines before installation.
- Do not autoclave (or any other high temperature sterilization) Control Box, AC Adaptor, Motor Code.
- The user shall be responsible for operation and maintenance and inspection.

1. Specifications

Model	Maxso E600P
Speed	2,000 ~ 40,000 rpm
Torque	3.4 Ncm
Rated Input	AC 24V / DC36
Noise Level	<60dB
Dimensions	W127 x D149 x H54 (mm)

2. Component Names



1. Control Box
2. Digital Speed Display
3. Gear Ratio Lamp
4. Gear Ration Select Key
5. FWD/REV Select Key
6. Program 1 Button
7. Program 2 Button
8. Speed Adjusters
9. Motor
10. Motor Cord
11. Power Switch
12. AC Adapter Connector
13. Motor Cord Connector
14. Turbine Hose Connector
15. AC Cord
16. AC Adaptor

3. Control Box Operation

Caution

Make sure there is no residual air or water in the turbine hose when connecting it to the control box. Hand tighten the nut properly without excessive force when connecting the turbine hose and the motor cord connector.

3-1 Connect the hand piece tubing from your delivery unit.

Fit the turbine hose plug from the delivery unit to the turbine hose connector and tighten completely.

Caution

- Do not use any other hose than the ones provided with the unit
- Do not use contaminated air
- Blow out the lines before installation

3-2 Connecting the Motor.

Connect the motor by aligning the motor cord plug and insert firmly.

3-3 Connecting the AC adapter

Insert the AC adapter plug into the AC adapter connector before plugging it into the wall outlet.

Caution

Never use any AC adapter other than the one provided with this product.

3-4 Connecting the Power Cord

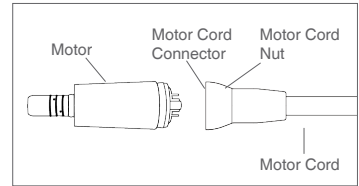
Insert the power cord into the inlet of the AC adapter.

4. Handling the Motor

4-1 Connecting/Disconnecting the motor and motor cord.

Align and insert the motor pin firmly into the pin holes of the motor cord connector and fasten the motor cord nut securely.

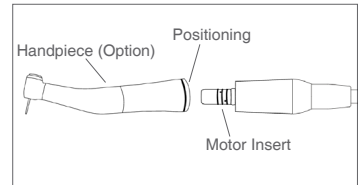
To remove the motor cord from the motor, unscrew and detach the motor cord nut, and gently pull out the motor cord connector.



4-2 Connecting/ Disconnecting the motor and hand piece

To insert the E-Type hand piece into the motor, align the hand piece and motor, then turn until you hear a click (positioning pins are aligned)

To remove the hand piece, simply pull the hand piece from the motor.



Caution

- Care should be taken when using any hand piece attachment which requires lubrication (E-Type micro motor).
- Following lubrication, stand the hand piece attachment vertically until the excess solution drains. Wipe the hand piece then attach it to the motor.
- Do not connect or disconnect the handpiece until the motor has completely stopped.

5. Operation

5-1 Insert the power cord plug into the AC outlet and turn the power switch on. When the power switch is on, the lamps and indicator will come on.

5-2 Before using this system, make sure to operate the Foot Air Calibration function.

5-3 Push the Gear Ratio Select Key to indicate the speed of the attachment you will use.

*Check Table Below for Speeds

Hand Piece Gear Ratio	Indicator	Speed (min ⁻¹ (rpm))
16:1	1 - 25	100 – 2,500
1:1	2 – 40	2,000 – 40,000
1:5	1 – 20	10,000 – 200,000



5-4 Set the maximum speed using the Rotation Adjustment Key (+/-).

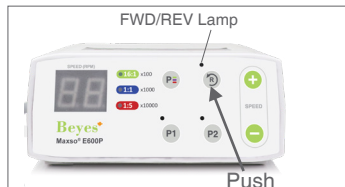
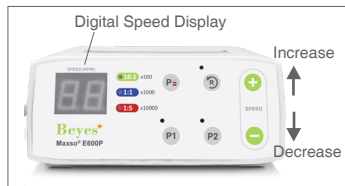
5-5 Select FWD/REV rotation using the FWD/REV Select key.

5-6 The micro motor operation is controlled by the air switch/ foot pedal of the delivery unit.

5-7 Program Function.

You can memorize the setting:

- 1) set the values for gear ratio, speed
- 2) Press P1 or P2 key for more than 3 seconds until it beeping, the setting is completed.



6. Sterilization

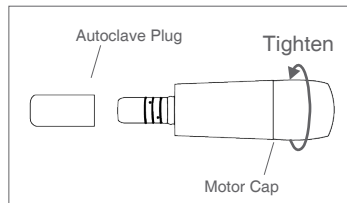
Sterilize the motor only.

For sterilization, we recommend the autoclave sterilization method.

Sterilization is required the first time you use the unit as well as after each patient as noted below.

Autoclaving

- 1) Turn off the power.
- 2) Detach the motor from the motor cord.
- 3) Clean the surface of the motor with a brush (Do not use a metal brush), and wipe it with cotton and disinfectant alcohol.
- 4) Screw the Motor Cap to the Motor. Put the Autoclave Plug onto the motor insert.
- 5) Insert into autoclave pouch. Seal the pouch.
- 6) Autoclavable up to a maximum of 135°C.
- 7) Keep the Motor in the autoclavable pouch until you are ready to use it to keep it clean.



! Caution

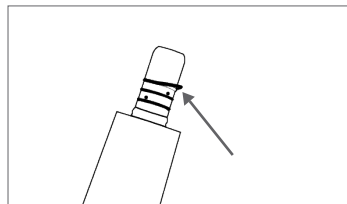
- Do not autoclave (or any other high temperature sterilization) Control Box, AC Adaptor, or Motor Cord.
- Do not lubricate the motor.
- Do not wipe or immerse the system in acidic water or acidic solutions.
- Do not sterilize with dirt on the surface, it may cause rust.

7. Maintenance

If the O-Rings become worn, the motor might not connect well to the hand piece, or water may leak. Replace the O-Rings.

Changing the O-Ring

Remove the O-Ring at the motor insert with a pointed tool, and mount the new O-Rings into the groove.



Caution

There are 4 O-Rings on the Motor Insert. The blue one is thinner than the other 3. Make sure to install them in the proper spot.

Caution

If the O-Rings become worn, it may cause:

- Air/Water leak
- Difficulty attaching/disconnecting the hand piece
- Excess Vibration

8. Error Codes

Error Code	Issue	Cause	Solution
E0	Overcurrent error (In Circuit)	Detected an overcurrent in the circuit	Contact your dealer
E1	Overcurrent error. (In Software)	Detected an overcurrent in the software	Contact your dealer
E2	Retry Error	Motor was overloaded and stopped and can not restart.	Contact your dealer
E3	ITRIP Error	Faulty motor or internal circuit	Contact your Dealer
E5	Overvoltage Input Error	Overvoltage to the control box	Contact your dealer
E6	LED voltage error	Overvoltage in the internal circuit.(more than 3.7V)	Contact your dealer
E8	Overheating error	High temperature safety system activated due to extended use .	Wait for a while and let it cool down before using again.

E9	Motor start error	Motor didn't reach the preset speed in the prescribed amount of time. Break down of the motor cord wire, or internal circuit malfunction	Contact your dealer
EA	LED voltage error	Voltage for the LED isn't high enough	Contact your dealer
Eb	Air offset error	Lower than preset "Lower limit of air pressure"	Displayed by foot/air calibration function. Not a Malfunction
Ec	Air full scale error	Higher than preset "Upper limit of air pressure" Air pressure higher than 0.4MPa	Displayed by foot/air calibration function. Not a malfunction
EE	EEPROM Error	Malfunction of the settings memory	Contact your dealer

9. Troubleshooting

When having an issue with the unit, check this guide before contacting your dealer. These are the most common issues which may occur.

Issue	Cause	Solution
Pilot Lamp does not come on	Power switch is off -AC Adaptor is not connected properly -Internal fuse is blown	Turn on the switch -Check the connection -Contact your dealer
Motor doesn't not run	Tubing, Motor Cord, AC adapter is not connected properly -Air pressure is not sufficient	Check the connection -Check the air pressure from the delivery unit -refer to Error code 9
The rotation speed is too slow	-Air pressure from delivery unit is too low -Air pressure on the delivery unit is lower than the "Lower limit of air pressure".	Check the air pressure on the delivery system. -Do "Foot/Air calibration
Beeps when turning on the switch	You are stepping on the foot pedal when turning on the power switch	Do not step on the foot pedal while turning on the switch

LED does not light up	Reached the end of life expectancy	Contact your dealer
Motor heats up abnormally during rotation	Coolant air is not coming out of the delivery unit	Check the air pressure of the delivery system
Water Leakage	Turbine, Motor cord is not connected correctly	Check the connection
When turned on, the setting values are different from what they were set to.	Turned off the motor while it was rotating	Do not turn off the unit until after the motor stops spinning

10. Beyes Limited Warranty Statement

10.1 Scope of Warranty

BEYES Dental Canada Inc. ('BEYES') warrants to the original retail purchaser that it will be at BEYES option to repair or replace components of the dental products manufactured by BEYES (except for components not warranted under 'Exclusions') that are defective in material or workmanship under normal use and service. BEYES' obligation under this limited warranty is limited to the repair or replacement of the applicable components. This limited warranty shall only apply to defects that are reported to BEYES within the applicable warranty period and which, upon examination by Beyes, prove to be defective. This warranty extends only to the first retail purchaser of a product and is not transferable or assignable. Replacement components or products may be used and/or refurbished components or products, provided they are of like quality and specifications as new components or products.

10.2 Applicable Warranty Period

The applicable warranty period, measured from the date of invoice to the original user, shall be warranted for a period of 25 months.

10.3 Exclusions

This limited warranty does not cover and BEYES shall not be liable for the following;

- 1) Defects, damage or other conditions caused, in whole or in part, by misuse, abuse, negligence, alteration, accident, freight damage, negligent storage, tampering or failure to seek and obtain repair or replacement in a timely manner;
- 2) Products which are not installed, used, and properly cleaned and maintained as required or recommended in the BEYES 'Installation' and/or 'Installation/User's Manual' for the applicable product, including the specified structural and operational environment conditions and electrical power requirements;
- 3) Products considered to be of a consumable or sterile nature;
- 4) Accessories or parts not manufactured by BEYES;
- 5) Charges by anyone for adjustments, repairs, replacement parts, installation or other work performed upon or in connection with such products which are not expressly authorized in writing in advance by BEYES;

- 6) Costs and expenses of routine maintenance and cleaning;
- 7) Representations and warranties made by any person or entity other than BEYES;
- 8) Matching of color, grain or texture except to commercially acceptable standards;
- 9) Changes in color caused by natural or artificial light;
- 10) Custom manufactured products;
- 11) Alterations or modifications to the product by any person or entity other than BEYES;
- 12) Products that would otherwise be covered under Sections 1 and 2 of this limited warranty, but are acquired: (i) from a person or entity that is not BEYES or one of its authorized dealers; or (ii) from a BEYES dealer that is not authorized to sell the product at issue in the geographic territory where the purchaser is located, or is not authorized to sell the product at issue within the medical, animal health or dental market, as the case may be, in which purchaser intends to use the product.

10.4 Exclusive Remedy; Consequential Damages Disclaimer

BEYES' OBLIGATION UNDER THIS LIMITED WARRANTY IS THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS. BEYES SHALL NOT BE LIABLE FOR AND HEREBY DISCLAIMS ANY DIRECT, SPECIAL, INDIRECT, INCIDENTAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES OR DELAYS, INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFITS OR INCOME, LOSS OF USE, DOWNTIME, COVER AND EMPLOYEE OR INDEPENDENT CONTRACTOR WAGES, PAYMENTS AND BENEFITS.

10.5 Warranty Disclaimer

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