

ENDOMOTOR D-SMART-I PRODUCT MANUAL

(please read this manual carefully before use)



INTRODUCTION

Thank you for choosing our company's Endomotor. In order to reach its full potential, use this machine effectively, accurately, and safely, please read this guidance carefully before use. In the meantime, please take good care of specification for easy reference.

The product is classified according to the type and degree of protection against electric shock, which is an ordinary equipment of an internal power supply type B application part of the continuous operation. The company is responsible for the safety, reliability and performance of the machine in the following conditions:

1.The installation, commissioning and maintenance of the machine shall be carried out by professionals who are approved by the company or have appropriate qualifications.

2.The operation of this machine is to be operated by qualified or authorized personnel, the operator shall have a special medical application skill, and shall be subject to our specification.

3.This machine can not be used in flammable anaesthetic gas that is mixed air or mixed with oxygen and Nitrous Oxide.

This equipment is a special device for dental use. Do not use this equipment in other places.

The company reserves the right to modify the machine design, product technology, accessories, product specifications and machine package contents at any time without notice. If pictures and objects have differences, please in kind prevail.

◇ please note

1. The company is not responsible for any failure or damage caused by the personnel who are not authorized by the company, please understand.
2. The company is not responsible for any failure or damage caused by modifying the product without authorization, please understand.
3. In addition to the products provided by the company, the company is not responsible for any failure or damage caused by other company's product, please understand.
4. The company is not responsible for any failure or damage caused by the use of other repair parts except for the regular parts specified by the company in maintenance and repair, please understand.
5. The company is not responsible for any failure or damage caused by not complying with specification to operate, please understand.
6. The company is not responsible for any failure or damage caused by product environment setting which is not complying with specification, please understand.
7. The company is not responsible for any failure or damage caused by such factors as earthquake, flood, lightning, etc, please understand.
8. The company's products provide correcting component within 5 years after the products are no longer produced, which 5 years as a repair possible period, please understand.

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1. Summary

Endomotor is an endodontic treatment equipment, which is converted into mechanical energy from the electrical energy and meets the goal of root canal mechanical expansion through the mechanical motor drive, micro-control. This machine is AIO for handheld operation.

1.1 Suitable Scope


Endomotor applies to root canal mechanical expansion of dental root canal therapy. It is used for pulp necrosis, chronic gingival periapical periodontitis, chronic periapical periodontitis(including periapical granuloma, periapical abscess and periapical cyst), teeth with pulpal periodontal syndrome and systemic disease that is not suitable to extract a tooth but need for treatment or temporary retention of the root canal mechanical expansion.

1.2 Product Features

1. The product is based on ergonomic design whose body is lightweight and is easy to carry.
2. When operating, using mini push - button 20: 1 (left and right reciprocating)Dental Contra-angle Handpiece to coordinate the machine files(hand files).
3. There are 6 kinds of procedures (Memory Set) for selection. It can input the optimum data in advance, and also can modify it according to the working conditions in use.
4. According to the set load point, it can automatically reverse and stop working and is able to remember different actions of each program.
5. Soft start and soft stop can be achieved and the operation is more comfortable. Simultaneously, it won't break the needle when root canal files encounter instantaneous shock.
6. Dental Contra-angle Handpiece and lamp holder can withstand 135°C high temperature and high pressure sterilization.
7. Built-in high-capacity lithium battery, so it can reduce battery change times and reduce costs for the machine.
8. There is a voice prompt when lack of power.
9. With LED lamp and high brightness, it can help doctors get a better look at the root canal environment.

Note: the normal operation, the prompt sound is sound 1; the operation confirmation, the prompt sound is the sound 2; the invalid operation or the warning, the prompt sound is sound 3.

2. Main Technology Parameters

The type of electric shock protection	Internal power supply
The level of electric shock protection	Using part of B type 
The protection degree of harmful liquid inlet	Common equipment
Running Mode	Continue operation

Host Machine

Battery Voltage	3.7Vdc
Battery Capacity	800mAh
Net Weight	About 210g

Power Adapter

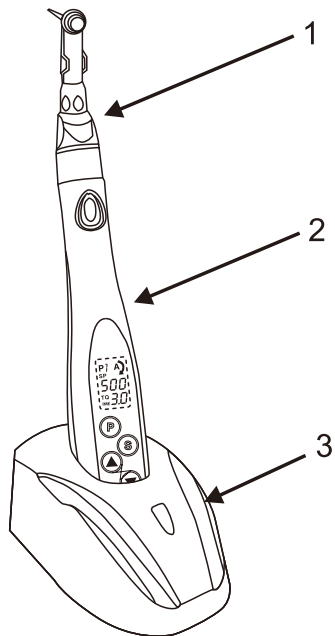
Rated Input Voltage	AC100~240V 60/60Hz
Output Voltage	5Vdc
Input Voltage	1A

Symbol Description

 : Using part of B type

 : See Instructions

3. Product Structure

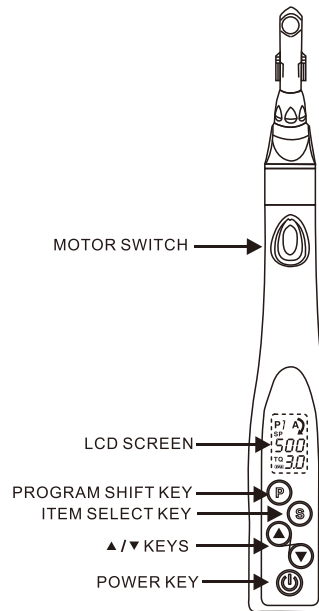


Structure is as follow:

1. Contra-angle Handpiece(set by user)
2. Host Machine
3. Charging Dock

Endomotor is mainly composed of a host machine, a treatment handle (Traction Motor), a rechargeable battery and a power adapter (charger).

4.Operation Panel and LCD Display



OPERATION PANEL DIAGRAM

- Power Key 

Long press POWER for over 1 second to open the power supply and the host, LCD screen will display, the key is invalid at this time and back to home screen after 1 second. When the main machine is on, press POWER button for 1 second, the power is off and the LCD panel will not display.

• Motor Switch

When the power is turned on, please press the motor switch, the host motor starts to rotate, then press the motor switch again, and the motor will stop rotating.

Pressing the motor switch for over one second to start the motor, loosen the motor switch, then motor will stop spinning.

• Item Select Key S

Pressing the Item Select key S, you can switch speed and torque.

The transfer sequence is: Speed Setting (SP) - Item Select key S - Torque Setting (TQ) - Item Select key S - Speed Setting (SP)

The selected item will be flashing displayed.

The speed and torque settings can be changed during the running of the machine.

The transfer sequence (ditto)(Torque can not be set manually under P2 and P4 programs)

• Program Shift Key P

Clicking the Program Shift Key P, you can switch 6 kinds of working procedures, as shown below:



Positive 360 ° automatic movement, forward rotation plus reversal torque, then remove the torque to restore forward.



Reverse reciprocating motion system, reverse 150 °, forward 30 ° (approximation)



Reverse 360 ° automatic movement, reverse rotation plus torque forward, then remove the torque to restore the reversal.



Forward reciprocating motion system, forward 150 °, reverse 30 ° (approximation)



Positive 360 °, when encounter torque, please stop. Using hand file to reciprocate Contra-angle Handpiece or Anti edge file to remove broken needle.



Reverse 360 °, when encounter torque, please stop. Using cutting edge file to remove broken needle.

After completing key config and waiting for the screen to stop flashing, the program will be autosaved, at this time press the Program Shift Key P to switch the program and set value of previous page will be autosaved.

Please note:

Forward definition: when cutting file, move clockwise.



•▲/▼keys

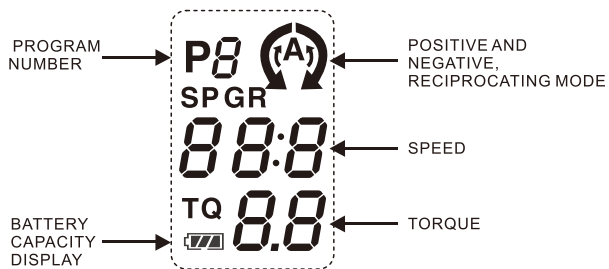
Used to increase or decrease the parameters of each item.

When the current item is flashing, press "▲/▼" to change the parameters of the current item.

Long press"▲/▼"key to adjust the speed and torque quickly; adjust the time automatically according to the long press time.

The machine factory optional mini push - button 16: 1 Contra-angle Handpiece. When used, refer to the following tables for the choice of parameter range:

speed range (rpm)	speed ratio	torque range (N.cm)
120-500	16:1	0.6-4.0



LIQUID CRYSTAL DISPLAY PANEL DIAGRAM

• Mode Display

Display current mode, in the reciprocating function, the torque is not adjustable:

- : Positive auto-continuous (auto reverse, if no load, will be forward again)
- : Reverse reciprocating motion
- : Reverse automatic continuous (auto forward, if not loaded, will be reversed again)
- : Forward reciprocating motion
- : Turn off automatic reverse(no automatic reverse)
- : Turn off automatic forward(no automatic forward)



Reverse reciprocating motion, the speed can be adjustable from 200 to 400 , reverse 150 °, forward 30 °(approximation)



Forward reciprocating motion, the speed can be adjustable from 200 to 400, forward 150 °, reverse 30 °(approximation)

• Battery Capacity Display

The following is a symbol of the current battery capacity, the battery will flicker.

- It indicates that the battery is full or will soon be full.
- It indicates that remaining capacity of batteries is 30%-80%
- It indicates that remaining capacity of batteries is less than 30%
- It indicates that the battery is running low, please charge.

Note: when the load is added to the host, the battery will be changed, which is a normal phenomenon. For security purposes, the motor automatically turns off when charging.

• Reset Setting

While on standby(positive/negative movement), install Contra-angle Handpiece and do not give extra load to it, then long press Item Select key S. When "CRL" appears on the screen, press the motor switch again to prompt "bee". At this time, the instrument will start to reset and then enter the lock screen interfaces.

Note: The use of the reset function is in situations in which the setting is correctly installed or the machine does not display or set the selected mode,

5. Usage

5.1.battery charging

a. Insert the power adapter charging plug into the cradle. At this time, the power indicator were always on.

b. Put the host in the direction of the operating panel outward into battery charging, at this time make sure that there is no foreign matter in the hole of the host of the cradle. After confirmation of the correct position, the buzzer sounds "bee" twice and "CHG" is displayed on the LCD screen, which means the battery is on charge. At the same time, battery capacity on the screen is animation display.

c. After a while the buzzer sounds "bee" twice and "FUL" is displayed on the LCD screen, which means the battery is full of energy now.

5.2. Handling method for Contra-angle Handpiece

When connecting Contra-angle Handpiece to the host, insert the locating pin of the Contra-angle Handpiece into the locating slot of the host until you hear a click. When removing it, pull it out in a parallel and straight direction.

Note: when Loading and unloading the Contra-angle Handpiece,, please turn off the motor.

5.3. Handling method for root canal files

Firstly, insert the file into the shaft hole of Contra-angle Handpiece , find the corresponding location, then insert a part of files, do not press the button on the Contra-angle Handpiece. Secondly, use slightly larger force to insert the file into the Contra-angle Handpiece. when removing, please press the button on the handpiece and pull the file out of the handpiece.

Note:

- When Loading and unloading the files, please turn off the motor.

- When installing the files, please press the files several times and make sure that files are correctly installed.

- Please ensure that the file is clean, if Dirt, etc. enter into the Handpiece, will lead to vibration of files.

5.4. Handling method for lamp holder

Insert the lamp holder into the host lamp holder socket and enter into Handpiece , ensure there's enough solid. When removing, slightly pull open button position of lamp holder from handpiece and then take advantage of up to discharge the lamp holder.

5.5. Operation

Long press the Power Key, the machine will be open and the screen will display. Then click the motor switch, files will begin to rotate and light will be on. Finally, press the motor switch again to stop rotation, and the LED will be out after 8 seconds.

Long press the motor switch and not to loosen, it will keep turning and light is on, if you loosen, it will stop turning and the LED will be also out after 8 seconds.

5.6. Termination of treatment

After treatment ends, the machine will begin to stop turning when pressing the motor switch; then long press Power Key to shut off the electric current; unloading the lamp holder from handpiece and then unloading the handpiece from the host, meanwhile cover the motor cover.

The function of automatic power outages

Power supply will be no operation automatically after about 5minutes off.

The function of Storage Media

Save the interface data before the shutdown, next time when you boot, it will restore the previous data.

6. Notes

Note:

- The forward rotation function and the reciprocating function mentioned in this instrument use different root canal files.

- Do not use the file which is bending crack deformation and out of specifications. If you use such files, it will lead to needle breakage and injury accident.

- Please follow manufacturer designated speed or torque of files when using.

- Do not use or place this product at high temperatures.

- When the host is put into the charging station, please pay attention to the direction, misdirection will lead to damage or can not be charged

- Do not give lubricants to the host and do not realize antiseptic disinfection at high temperatures and pressure.

- This product is not waterproof, so it can not touch water, solution and so on. To prevent short-circuit caused by heat or rust and other damage to the machine, but also is likely to cause equipment discoloration

- Do not drop the host and cradle and place the cradle in a flat and stable place.

- Please use our configured power adapter to charge, do not use other power adapter.

- Please use the handpiece we provide or accept.

Otherwise it may result in incorrect operation of the machine.

- This instrument does not generate electromagnetic interference to equipment in the same environment, but please avoid the strong magnetic field and strong electric field.

Contraindications:

Please do not use with high-frequency surgical equipment and heart patients should be used with caution

If you don't get a doctor's advice, patients with implantable electronic devices such as cardiac pacemakers should be advised not to use this product.

7. Troubleshooting Guide

If the product is not operating normally, please refer to the following methods for maintenance and adjustment.

Troubles	Possible problems and treatment method
Can not turn on	The batteries are probably dead, please charge.
	key-press time is too short, please long press POWER for over 1 second
	The POWER key doesn't work, please contact local dealer or manufacturer
No display when charging	The power adapter is not plugged in, please reconnect the power adapter.
	There is a foreign object on the bottom of the host or on the cradle, please clean up.
	The host is not properly placed on the charging seat

There are no parts you can repair by yourself. If the machine still can not run normally after the above method, please contact the dealer or our company.

8. Maintenance

- If the product don't use temporarily, next time it is reused , please ensure that it is normal and safely run.

- When you do not use it for a long time, it should be charged once a month to protect the life of the lithium battery

- The working life is about 5 years since the purchase date.

- When there is dirt on the surface of the machine, wipe it with a soft cloth with some mild detergent and then wipe it with a damp cloth.

Note: Do not use ethanol (alcohol), lacquer thinner, light gasoline to wipe. Do not place the machine in the sun exposure and bake by the fire, so as not to cause the battery explosion.

9. Disinfection

Please only give the root canal files, dental handpiece and lamp holder for sterilization.

The methods of high temperature and pressure disinfection:

Please use a brush (do not use metal brush) to brush away the dirt attached to the surface, then wipe clean with a soft cloth with alcohol disinfected.

The temperature should not exceed 135 ° C (eg 121 ° C / 20 minutes or 132 ° C / 15 minutes for autoclaving) during autoclaving.

When not in use, please seal in a sterile bag and keep in a clean place.

Note:

- Please only give the root canal files, dental handpiece and lamp holder for sterilization.
- As the bottom of high-temperature sterilization rack near the heat source, the local temperature will be high, so as far as possible put the vessel in the middle or upper.
- Do not use electrolyzed-oxidizing water (strong acid water, super-acid water) or sterilized solution to wash, dipping, wipe containers

10. Transportation and Storage Condition

Storage condition: Storage temperature range: --
40°C~55°C: Relative humidity Range: less than 95%:
Atmosphere range: 50kPa~106kPa

Environmental conditions: no sun, no rain, no dust, no corrosive gases, no chemical volatiles and well ventilated place.

Transportation: ordinary mode of transport are applicable, handle gently.

11. Packing List

The Host	1
Charging Dock	1
Lamp Holder	2
Power Adapter	1
Motor cover	1
Product Specification	1
Product certificate	1
Environmental protection:	

The metal part of the product is treated as scrap metal. Synthetic materials, electrical components and printed circuit boards are treated as waste electrical appliances. The disposal of the relevant material must be handled in accordance with local regulations and it should be handled in consultation with the local company that specializes in waste disposal.

This manual is a combination of the operating instructions and the technical specifications.

For technical reasons, this specification does not provide the circuit diagram and component list specified by GB9706.1-2007. If the user needs, please contact us.

12. After-sales Service

All our goods are guaranteed replacement for 7 days and provide maintain service free for one year due to quality problem. If you buy our product more than one year, you should pay repair parts costs. About accessories ,we will provide maintain service free for six months. If accessories(such as Power Adapter, Motor cover and Lamp Holder) damage or run out, you can purchase from our company.

Guarantee Receipt of Endomotor

Client Information	
Client Name	
Contact Number	
Address	
Postal Code	
Sales Information	
Company Name	
Contact Number	
Address	
Factory NO	
Invoice NO	
Sales Date	
Unit Seal	

Maintenance Record

Date	The Diagnosis	Fault Cause	Examination Date	Maintenance Engineer
Treatment:				

Date	The Diagnosis	Fault Cause	Examination Date	Maintenance Engineer
Treatment:				

Date	The Diagnosis	Fault Cause	Examination Date	Maintenance Engineer
Treatment:				

