Multifunctional Endo Motor Instruction Manual



Guangzhou RebornEndo Medical Instrument Co., Ltd.

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1 Product Description

1.1 Preface

Guangzhou RebornEndo Medical Instrument Co., Ltd was founded in 2016. It is a high-tech enterprise which has a professional R& D and sales team in dental root canal treatment fields.

The company is located in China Pilot Free Trade Zone: Nansha New District, Guangzhou, which is adjacent to the core regional resources of the Guangdong-Hong Kong-Macao Greater Bay Area.The ideal place provides an excellent convenience for business trades. Since its establishment, the company insists on the development concep of customer obsess and perfect quality products. It provides a perfect root canal solutions for global dentists. RebornEndo has built a young and energetic team which focus on high-standard design, R&D, developing, and producing dental products. RebornEndo products have obtained the international quality certification: ISO、CE and CFDA.

1.2 Product Introduction

Multifunctional Endo Motor is a medical device for dentists to perform endodontic treatment. It can be used as a Endo Motor for preparation and enlargement of root canals, or device for measuring canal length. It can be used to enlarge the canals while monitoring the position of the file tip inside the canal.

The main features of the devices are:

No.	Features	Models
1	Cordless portable endo motor with combined length determination.	R-Smart Pro、R-Smart Expert、R-Smart Classic、R-Smart W-Pro、R-Smart W-Expert、R-Smart W-Classic
2	Intelligent matrix anti-interference apex locating algorithm.	R-Smart Pro、R-Smart Expert、R-Smart Classic、R-Smart W-Pro、R-Smart W-Expert、R-Smart W-Classic
3	360 degrees rotation of contra angle.	R-Smart Pro、R-Smart Expert、R-Smart Classic、R-Smart W-Pro、R-Smart W-Expert、R-Smart W-Classic
4	AIC automatic intelligent adaptive system algorithm.	R-Smart Pro、R-Smart Expert、R-Smart W-Pro、R-Smart W-Expert
5	RBF mode to remove the broken file in the cannal root.	R-Smart Pro、R-Smart Expert、R-Smart W-Pro、R-Smart W-Expert
6	Bluetooth data transmission.	R-Smart Pro、R-Smart W-Pro
7	Optimum apical action.	R-Smart Pro、R-Smart W-Pro
8	Optimum Glide Path Function.	R-Smart Pro、R-Smart W-Pro
9	Optimal self-adaption and trigger torque mode.	R-Smart Pro、R-Smart W-Pro

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1.3 Model and Specification

R-Smart Pro、R-Smart Expert、R-Smart Classic：Wired charging, the device can be charged through electric contact.

R-Smart W-Pro、R-Smart W-Expert、R-Smart W-Classic：Wireless charging, the device can be charged through an induction coil.

Product Size：27.5mm*29.1mm*202.1mm.

Product Weight：158.3g.

1.4 Performance and composition

The device is composed of charging base, motor handpiece, contra angle, measuring wire, lip hook, file clip, power adapter, etc.

1.5 Scope Of Application

The device can be used for preparation and enlargement of root canals, or device for measuring canal length.

It can only be used by professional dentists in hospital environment, clinic in accordance with national regulations.

1.6 Contraindications

It is forbidden to use this instrument in the following situations：

1.6.1 The doctor with a pacemaker is disabled.

1.6.2 Patients with cardiac pacemakers (or other electrical equipment) are warned not to use small appliances (such as Electric razors, hair dryers, etc.) patients are disabled.

1.6.3 Hemophilia patients are banned.

1.6.4 Use with caution in patients with heart disease, pregnant women and young children.

1.7 Warning

This section contains descriptions of serious side effects and potential safety risks for the product itself and users/patients. The following warning clauses must be read before use：

1.7.1 The instrument can only be used by professional dentists in accordance with national regulations.

1.7.2 The instrument can only be used in designated places and cannot be used outdoors.

1.7.3 The instrument requires special precautions regarding electromagnetic compatibility (EMC) and must be in strict accordance with the EMC information for installation and use. Do not use this equipment especially in the vicinity of fluorescent lamps, radio transmitting devices, remote control devices, handheld and mobile high frequency communication devices.

1.7.4 It is forbidden to expose the instrument directly or indirectly to a heat source. The instrument must be operated and stored in a safe environment.

1.7.5 It is forbidden to use it under conditions with flammable anesthetic

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mixtures.

1.7.6 Do not immerse it in liquid.

1.7.7 Only suitable for original accessories.

1.7.8 Please use original power adapter. Other power adapter will result in damage to lithium battery and control circuit.

1.7.9 Do not use damaged or defective instruments.

1.7.10 Do not carry out any repairs or modifications without authorization. In case of failure, please contact your local dealer and do not allow unauthorized personnel to repair.

1.7.11 Please do not make any changes to the device. Any changes may violate safety regulations, causing harm to the patient. There will be no promises of any modification.

1.7.12 Please confirm whether the file is well installed and locked before starting the motor handpiece.

1.7.13 The instrument complies with electromagnetic compatibility standards, but it is still necessary to prevent possible risks caused by electromagnetic interference.

1.7.14 Please remove the battery if the motor handpiece is not likely to be used for some time.

1.8 Instrument Safety Classification

1.8.1 Type of operation mode: Continuous operating device.

1.8.2 Type of protection against electric shock: Class II equipment with internal power supply.

1.8.3 Degree of protection against electric shock: B type applied part.

1.8.4 Degree of protection against harmful ingress of water: Ordinary equipment (IPX0).

1.8.5 Degree of safety application in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide: Equipment cannot be used in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide.

1.9 The Main Technical Parameters

1.9.1 Lithium battery：3.7V/ 1500mAh

1.9.2 Power Adapter：

Input： ~ 100V-240V 50Hz/60Hz 0.5A

Output：DC 5V/ 2A

1.9.3 Speed rang：100-1000rpm

1.9.4 Torque rang：0.4~5.0 N.cm

1.9.5 Adapter fuse: T2AL250V

1.9.6 The shaft of the instrument used with the contra-angle handpiece conforms to YY/T 0967, type 1 rod, with a diameter of 2.35mm, a minimum

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matching length of 9mm, and a maximum total length of the bur 33mm. The gear ratio is 16:1.

1.9.7 Environment parameters:

1）Environment temperature: 0 ~ 40℃

2）Relative Humidity:10 ~ 85%RH

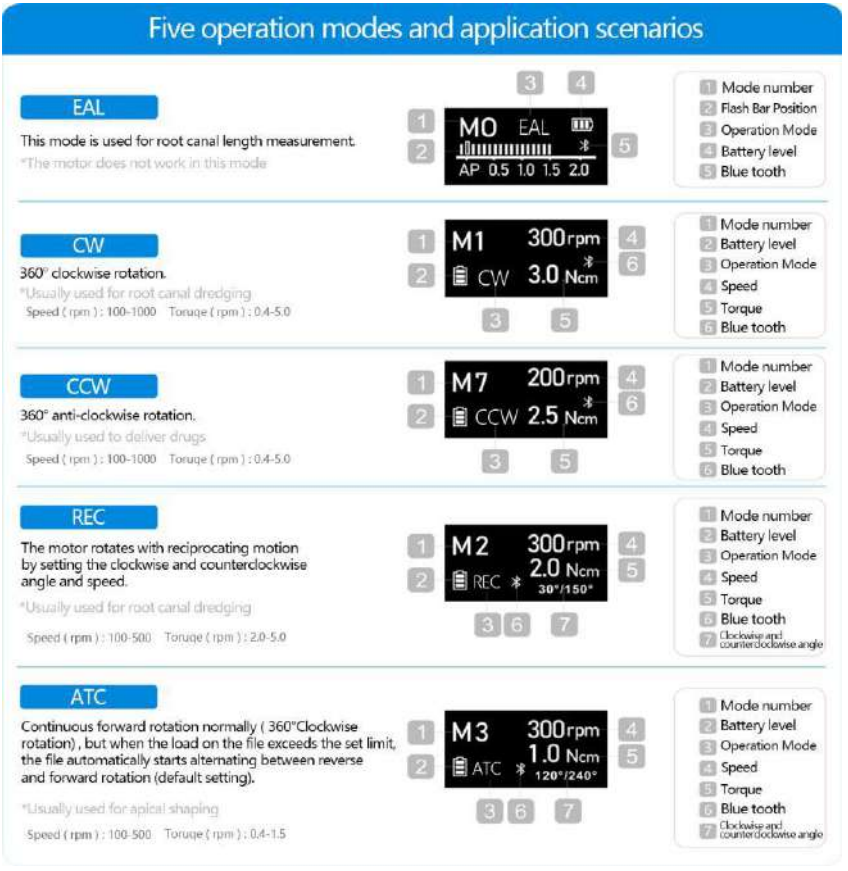
3）Atmospheric pressure:70kPa ~ 106kPa

2 Functional Overview

This device provides root canal enlargement and root canal length measurement functions for root canal treatment. The treatment objects are divided into ordinary root canals and complex root canals.

2.1 Operation Mode And Memory Mode

The device provides 5 operation modes, which can be operated and used according to the user's expected needs. The 5 operation modes and application scenarios are:



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Optimum Glide Path Function（OGP）(only available for R-Smart Pro、R-Smart W-Pro）：

A Motion:

180°clockwise, and then 180°anti-clockwise reverse rotation.

B Motion:

180°clockwise, and then 270°anti-clockwise reverse rotation.

Repeat the watch-winding (A) motion and balanced force (B) motion.

OGP can be setted the status (ON/OFF) in REC mode.

If the OGP function is the 'ON' status,the instrument operates according to the motion mode of OGP mentioned above. In this case, the instrument can not set the forward and reverse rotation angles.

If the OGP function is the 'OFF 'status,the instrument can set the forward and reverse rotation angles. Adjustment range of forward / reverse rotation angle:30 °- 370 °. It can increase or decrease the angle by pressing '<' / '>'.

The angle adjustment step value is 10 °. It is recommended that the sum of forward rotation angle and reverse rotation angle should be greater than or equal to 120 °.

OGP is applicable to W-One/ R-One (R3 Endo File) produced by the equipment manufacturer or other similar Endo File.

2.1.2 Optimum Torque Reverse Function（OTR）

Optimum Torque Reverse Function （OTR） (only available for R-Smart Pro、R-Smart W-Pro）：

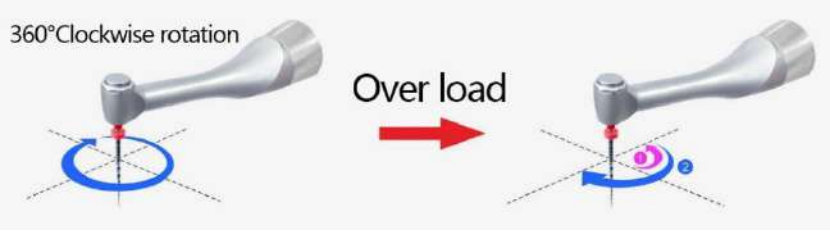
Continuous forward rotation normally (360°Clockwise rotation) , but when the load on the file exceeds the set limit, the file automatically starts alternating between reverse（Motion 1） and forward (Motion 2) rotation (default setting). When the load on the file belows the set limit again, the file recovery 360°Clockwise rotation.

Motion 1:

90°anti-clockwise reverse rotation.

Motion 2:

180°clockwise rotation.



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OTR can be setted the status (ON/OFF) in ATC mode.

If the OTR function is the 'ON' status,the instrument operates according to the motion mode of OTR mentioned above.In this case, the instrument can not set the forward and reverse rotation angles.

If the OTR function is the 'OFF'status,the instrument can set the forward and reverse rotation angles. Adjustment range of forward / reverse rotation angle:30°- 370°. It can increase or decrease the angle by pressing '<' / '>'.

The angle adjustment step value is 10 °. It is recommended that the sum of forward rotation angle and reverse rotation angle should be greater than or equal to 120 °.

OTR is applicable to W-One/ R-One (R3 Endo File) produced by the equipment manufacturer or other similar Endo File.

2.2 Memory Mode

2.2.1 Self-defined Mode & Preset File-parameter Mode

The mode of R-Smart Pro、R-Smart W-Pro

This equipment is designed with 18 memory modes (11 self-defined modes and 7 preset file-parameter modes) .

M0 to M10 memory mode are self-defined modes.

The 11 self-defined modes can complete a whole endo treatment.

Especially, almost all canals can be treated with the default settings of the memories from M0 to M3. However, settings can be changed to suit various stages of treatment.We recommend using the default settings until the user has gotten used to how the instrument works.

Memory mode	Main uses with default setting	Operation mode	Applicable scene	Default speed (rpm)	Default torque（Ncm）
M0	Canal measurement	EAL	Apex locating	—	—
M1	Shape the upper part of the canal	CW	Treatment of normal canal	300	3.0
M2	Negotiation and making a glide path for a normal canal	REC	Treatment of normal canal	300	2.0
M3	Canal shaping for a normal canal	ATC	Treatment of normal canal	300	1.0
M4	Negotiation and making a glide path for a complex canal	REC	Treatment of complex canal	100	2.0
M5	Making a glide path for a complex canal	REC	Treatment of complex canal	300	2.5
M6	Canal shaping for a complex canal	ATC	Treatment of complex canal	300	1.0

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M7	Injection solutions such as calcium hydroxide, etc	CCW	Injection solutions	200	2.5
M8	SGP	T-Mode	Elimination of root canal steps	300 (SGP spped）	/
M9	Full Automatic mode	AIC	AIC automatic intelligent adaptive system algorithm	—	—
M10	Remove Broken File mode	RBF	Remove the broken file in the root canal	500	3.0
M11	Preset File-parameter Mode	CW	Store file parameters of RebornEndo	300	3.0
M12	Preset File-parameter Mode	REC	Store file parameters of main brands and RebornEndo	300	2.5
M13	Preset File-parameter Mode	REC	Store file parameters of main brands and RebornEndo	300	2.5
M14	Preset File-parameter Mode	REC	Store file parameters of main brands and RebornEndo	300	2.5
M15	Preset File-parameter Mode	REC	Store file parameters of main brands and RebornEndo	350	2.0
M16	Preset File-parameter Mode	REC	Store file parameters of main brands and RebornEndo	350	2.0
M17	Preset File-parameter Mode	REC	Store file parameters of main brands and RebornEndo	350	2.0

M9: Full Automatic mode. Operator can refer to this manual (chapter:2.2.2) for details.

M10: Remove Broken File mode. Operator can refer to this manual (chapter:2.2.4) for details.

M11 to M17 memory mode are preset file-parameter modes.

The 7 preset file-parameter modes are used to store file parameters of main brands by a cloud storage system, which is convenient for users to call parameters store according to their needs.

The mode of R-Smart Expert、R-Smart W-Expert

Memory mode	Main uses with default setting	Operation mode	Applicable scene	Default speed (rpm)	Default torque（Ncm）
M0	Canal measurement	EAL	Apex locating	—	—
M1	Shape the upper part of the canal	CW	Treatment of normal canal	300	3.0
M2	Negotiation and making a glide path for a normal canal	REC	Treatment of normal canal	300	2.0
M3	Canal shaping for a normal canal	ATC	Treatment of normal canal	300	1.0
M4	Negotiation and making a glide path for a complex canal	REC	Treatment of complex canal	100	2.0

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M5	Making a glide path for a complex canal	REC	Treatment of complex canal	300	2.5
M6	Canal shaping for a complex canal	ATC	Treatment of complex canal	300	1.0
M7	Injection solutions such as calcium hydroxide, etc	CCW	Injection solutions	200	2.5
M8	Preparation with one file	REC	Preparation with one file	300	3.0
M9	Full Automatic mode	AIC	AIC automatic intelligent adaptive system algorithm	—	—
M10	Remove Broken File mode	RBF	Remove the broken file in the root canal	500	3.0
M11	Preset File-parameter Mode	CW	Store file parameters of RebornEndo	300	3.0
M12	Preset File-parameter Mode	REC	Store file parameters of main brands and RebornEndo	300	2.5

The mode of R-Smart Classic、R-Smart W-Classic

Memory mode	Main uses with default setting	Operation mode	Applicable scene	Default speed (rpm)	Default torque（Ncm）
M0	Canal measurement	EAL	Apex locating	—	—
M1	Shape the upper part of the canal	CW	Treatment of normal canal	300	3.0
M2	Negotiation and making a glide path for a normal canal	REC	Treatment of normal canal	300	2.0
M3	Canal shaping for a normal canal	ATC	Treatment of normal canal	300	1.0
M4	Negotiation and making a glide path for a complex canal	REC	Treatment of complex canal	100	2.0
M5	Making a glide path for a complex canal	REC	Treatment of complex canal	300	2.5
M6	Canal shaping for a complex canal	ATC	Treatment of complex canal	300	1.0
M7	Injection solutions such as calcium hydroxide, etc	CCW	Injection solutions	200	2.5
M8	Preset File-parameter Mode	CW	Store file parameters of RebornEndo	300	3.0
M9	Preset File-parameter Mode	REC	Store file parameters of main brands and RebornEndo	300	2.5

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2.2.2 SGP（T-Mode）

T-Mode is only available for R-Smart Pro、R-Smart W-Pro：

In T-mode, if the main button is triggered for the first time, the motor will run in SGP mode. If the main button is pressed again, the motor will run in the mode preset by the user.



2.2.3 AIC Full Automatic function

AIC is only available for R-Smart Pro、R-Smart W-Pro、R-Smart Expert、R-Smart W-Expert：

The AIC function is a Full Automatic mode. It built in a set of AIC automatic intelligent adaptive system algorithm. It does not need any parameter settings. Operator can choose the AIC function and uses it immediately.The AIC function is suitable for 360 ° continuous rotary file at low speed with CW/CCW.

This function is only effective when endo preparing accompanied by root canal length measurement. When the file keeps 360 °continuous rotation, the instrument can intelligently analyze and automatically adjust the rotation mode, speed and torque according to the resistance of the root canal file in the root canal, different root canal conditions and the position from the apical point automatically measured. The AIC function meets the requirements of safe and efficient root canal shaping. And the AIC function set at M8 mode.

2.2.4 The way to call preset parameters of file

The following explains just take R-Smart Pro/ W-Pro for example.

M0-M9：Press and hold the S key for 2 seconds,call the parameters of main brands endo file (include RebornEndo R3 file and other main brands file) for choose. After selecting the file parameters, the system will store the selected file parameters in M12.

M11： Press and hold the S key for 2 seconds, call the parameters of RebornEndo R3 file for choose. After selecting the file parameters, the system will store the selected file parameters in M11.

M12-M17： Press and hold the S key for 2 seconds,call the parameters of main brands endo file (include RebornEndo R3 file and other main brands file) for choose. After selecting the file parameters, the system will store the selected file parameters in the current mdoe program.

Note:

The parameters stored by default are for reference only.The specific parameter setting must be based on the actual clinical operation process, combined with the actual root canal environment, the recommended value of the file manufacturer, etc.Users need to adjust appropriate parameters and operation modes according to the actual situation.

The way to call preset parameters of endo file in R-Smart Expert/ W-Expert、R-Smart Classic/ W-Classic is similar with the above explains.

2.2.5 The way to call parameters of removing broken file

RBF is only available for R-Smart Pro、R-Smart W-Pro、R-Smart Expert、R-Smart W-Expert：

M10 (RBF)：M10 stores the parameters of main brand instruments used for removing broken file.It usually includes the storage of parameters and motion modes of the instruments of main brands such as G-drill and Ring-drill.The system will automatically match the corresponding motion mode and store it in M10. Users do not need any setting parameters.

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Tooth Icons

Normal Canals
Canals with normal shapes.
This is for most canals.

Complex Canals
Extremely curved canals, ledged canals, blocked canals, etc.

Linkage to Canal Measurement Function
If the contrary electrode is applied to the patient, the instrument can be linked to the canal measurement function while it is being used.

Canal Shapes

Almost all canals can be treated with the default settings of the memories from m0 to m3.

Chapter 2.2.1

If using this instrument for the first time,refer to "Canal Shaping (for normal canals)"

Chapter 5.2

Modes

The Endo Motor has 5 different operating modes which can be used for depending on your intended use.

Chapter 2.1

Memories

There are 17 memories with different combinations of motor operation, speed etc. that can be used at different stages of the treatment.
Memory settings can be customized.

Chapter 5.2.1

Canal Treatment

Turn Power On
Press the Main switch.



1 Upper Part Shaping
Enlarge the upper part of the canal to make treatment easier.

Normal Canals
Memory: M1
Mode: CW
Chapter 2.2.1

Complex Canals
Memory: M1
Mode: CW
Chapter 2.2.1

2 Canal Measurement
Measure the canal to determine the working length.

Normal Canals
Memory: M0
Mode: EAL
Chapter 5.2.1

Complex Canals
Memory: M0
Mode: EAL
Chapter 5.2.1

*M0 is mainly used for root canal length measurement.



3 Glide Path
Use a proper file to make the glide path needed for shaping.

Normal Canals
Memory: M2
Mode: REC
Chapter 2.2.1

Complex Canals
Memory: M4/M5
Mode: REC
Chapter 2.2.1

*REC working mode is recommended for M2/4/5.

4 Canal Shaping
Change file sizes as you shape the canal.

Normal Canals
Memory: M3
Mode: ATC
Chapter 2.2.1

Complex Canals
Memory: M6
Mode: ATC
Chapter 2.2.1

*ATC working mode is recommended for M3/6.

5 Drug delivery
The motor rotates counterclockwise.
M7 is mainly used for delivering therapeutic drugs.

Normal Canals
Memory: M7
Mode: CCW
Chapter 2.2.1

Turn Power Off
Hold the S key and then press the Main switch.



3 Symbol instruction



Switching button



Volume Modulation



Registered trademark



Indoor Use Only



Direct Current



Cautions! Refer to attached documents



Class II Equipment



B type applied part



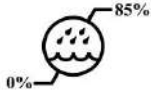
Retrieve



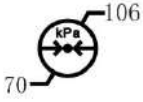
Keep Dry



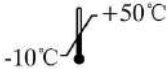
Fragile products



Humidity limit for storage: 0% ~ 85%



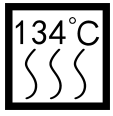
Atmospheric pressure for storage: 70kPa—106kPa



Temperature limit for storage: 10°C ~ +50°C



Refer To The Instruction Manual Before Use



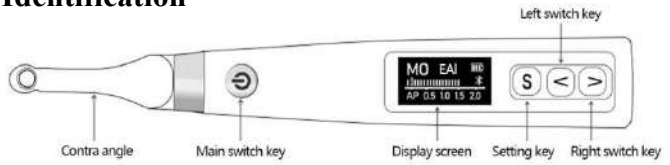
134°C disinfection and sterilization

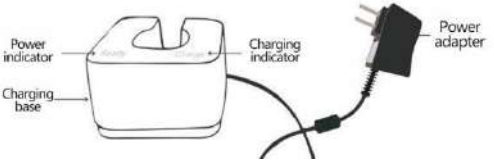


Dispose of waste products and accessories in accordance with the "Waste Electronic Equipment (WEEE) Directive (2002/96/EC)"

4 Parts Identification and Display Screens

4.1 Parts Identification





4.2 Components and Accessories



motor handpiece



Contra Angle



Silicone sleeve



Battery



lip hook



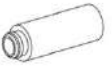
Probe



File Clip



Measuring wire



Oil filling nozzle

5 Operation

5.1 Before Use

5.1.1 Product Installation

a）Installation of Contra Angle

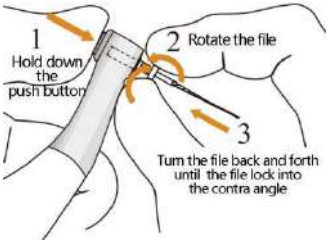
Align any locating pin of the contra-angle with the positioning slot on the motor handpiece and push the contra-angle horizontally. The locating pins on the contra-angle are inserted into those positioning holes on the motor handpiece. A “click” sound indicates that the installation is in place. The contra-angle can be rotated 360° freely.

The contra-angle is free to rotate, adapting to the root canal of different positions, and it is convenient to watch the screen when operating.

Gently pull the contra-angle to ensure that it is firmly installed.If the connection is not firm, it may cause unpredictable rotation or the contra-angle may separate.what's worse, it may hurt the patient.

b）Installation of file

Before starting the device, plug the file into the hole of contra angle head. Hold down the push button on the contra angle and insert the file. Turn the file back and forth until it is lined up with interior latch groove and slips into place. Release the button to lock the file into the contra angle.



Warning：

After plugging the file into contra angle, let go the hand on push cover to assure that the file cannot be taken out. Be careful when inserting files to avoid injury to fingers.Inserting and removing files without holding the push button may damage the chuck of contra angle.Please use files with shanks meet the ISO standard.

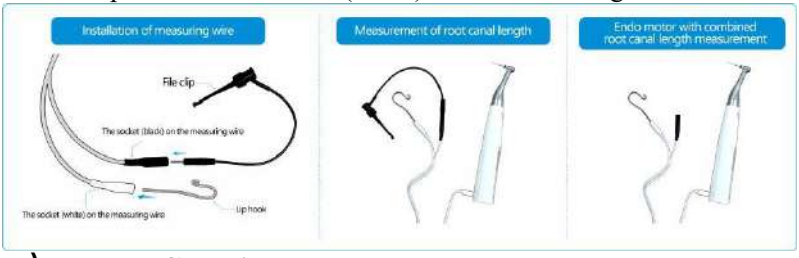
Removal of file: Pressing the push cover, and then directly pull out the file.

Warning：

Before plugging and pulling out the file, the motor handpiece must be stopped. Be careful when removing files to avoid injury to fingers.Removing files without holding the push button will damage the chuck of contra angle.

c）Installation of measuring wire

Connect the measuring wire to the motor handpiece. Line up the measuring wire plug with the notch on the back of the motor and push it all the way in.Connect the file clip plug into the socket (black) on the measuring wire. Connect the lip hook to the socket (white) on the measuring wire.



d）Battery Charging

The device can be charged in two ways:

① By host：Plug the DC end of the adapter cable into the charging port of the host, and charge the device directly.

② By charger：Plug the DC end of the adapter cable into the the charger, and plug the other end into a power outlet. The Ready LED (green) will light up.

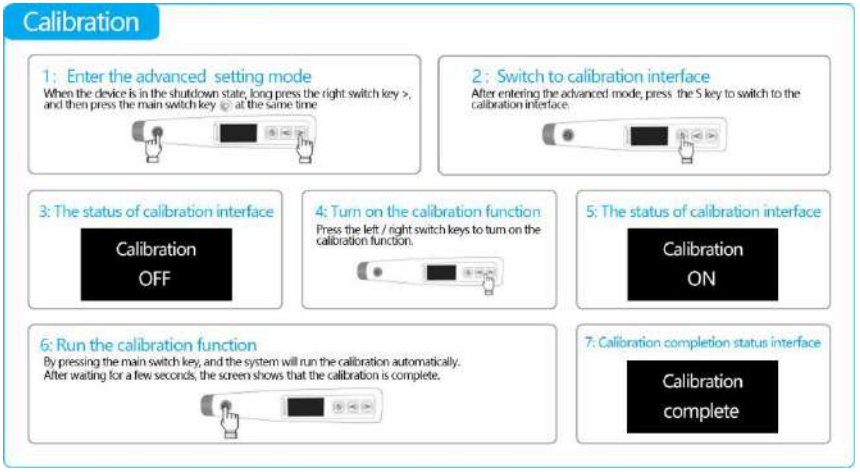
Put the motor handpiece all the way into the battery charger. The Ready LED (green) will go out and the Charge LED (orange) will light up and start

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charging the motor handpiece.

When the battery is fully charged, the Charge LED (orange) goes out and the Ready LED (green) will light up.

5.1.2 Calibration



Calibration is automatically performed from 100 to 1,000 r/min.After calibration, operator can press the main switch key ⏻ or wait for several second, and then the instrument will automatically return to the standby screen.

Note：

Calibrate the instrument at the following times:

•Right after purchase.

•Whenever the contra angle has been replaced.

•When using a contra angle other than the one that has been calibrated.

•Whenever, in OTR mode, the instrument always alternates between forward and reverse rotation and never rotates forward continuously.

5.2 In use

5.2.1 Operation of self-defined Mode

Enter standby statement

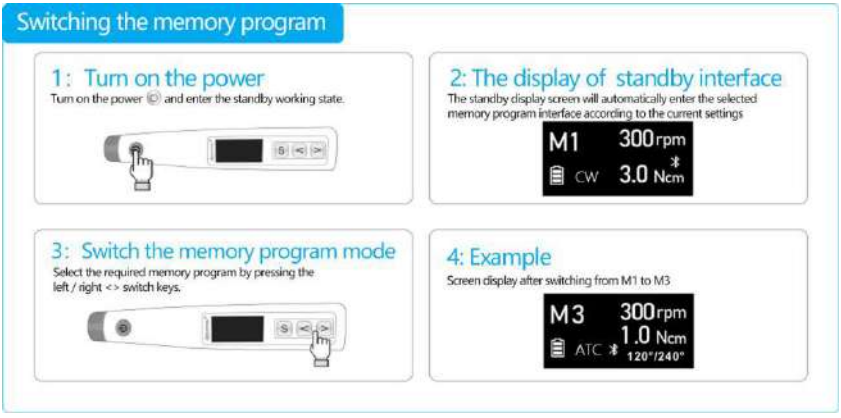
Press the main switch key ⏻ to turn on the instrument. The stand by display will appear.

Choose language version



- ❖ The language version can be divided into Chinese and English.
- ❖ The operator can press and hold the s key for more than 4 seconds to switch the language version.

Switching memory mode



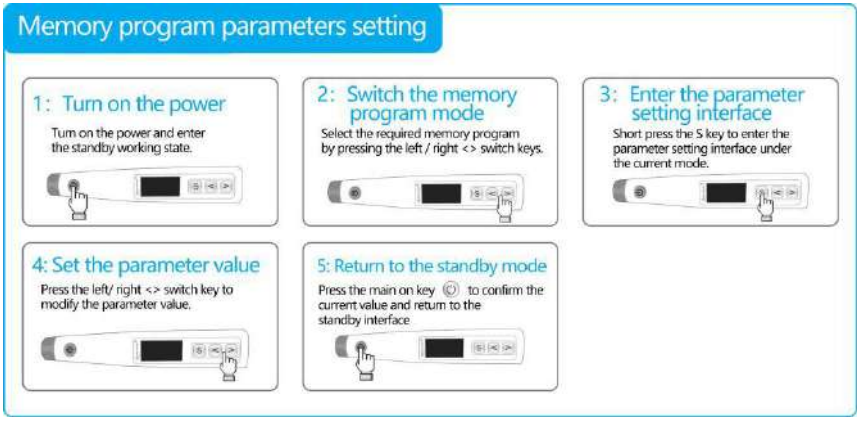
When switching to the required memory mode, It can stay for several seconds (according to the habit of the operator) or press the main switch key ⏻ to confirm the memory mode of the current interface.

Set the parameters of memory mode

The parameters of the instrument can be set in the case of no load condition.The parameters including speed, torque, forward rotation angle, reverse rotation angle, apical action, etc.

The specific parameter setting must be based on the actual clinical operation process, combined with the actual root canal environment, the recommended value of the file manufacturer, etc.Users need to adjust appropriate parameters and operation modes according to the actual situation.

If operator need to set the forward and reverse angles, OGP / OTR should be turned off. It can refer to the manual for details according to the chapter 2.1.1& 2.1.2.



It can switch the parameter setting by pressing S key.Parameter categories are as follows:

Parameter category	Display screen	Parameter setting
Operation Mode		Five operation modes used for Endo Motor for preparation and apex locating: EAL、CW、CCW、REC、ATC
Speed		CW、CCW：100~1000 rpm REC、 ATC/AIC：100~500 rpm
Torque		CW：0.4~5.0 N.cm CCW：0.4~5.0 N.cm REC：2.0~5.0 N.cm ATC/AIC：0.4~1.5 N.cm
Apical Action		Reverse / Stop / OFF/ OAS
Auto Start		ON / OFF
Auto Stop		ON / OFF
Flash Bar Position		Apply to EAL、CW、CCW、REC、ATC/AIC
Apical Slow Dwn		ON / OFF
SGP Angle		Only activating in T-Mode. In the T-mode, the SGP Angle of 30°~370° are available.
SGP Speed		Only activating in T-Mode. In T-mode, the SGP speed of 100~500rpm are available.
Present Mode		Only activating in T-Mode. It has 4 preset modes : CW, CCW, REC, ATC.

Enter the parameter setting interface, it can press the '< ', ' > ' key to change the parameters.

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Starting the working state

After the parameter setting is completed, the equipment will automatically enter the standby working state. At this time, the equipment motor will work by pressing the main key on the host.

The equipment motor also can work by opening the auto start function, while it is in the state of endo preparation accompany with apex locating.At this time, once the endo file get into the root canal, it will automatically rotate.

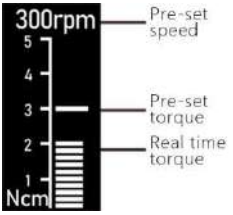


Fig. Press the main key



Fig. Auto Start

After starting the motor , the display will show the torque display bar in the right figure real time.



Bluetooth connectivity

Bluetooth is only available for R-Smart Pro、R-Smart W-Pro：

The device has built-in Bluetooth connection function.It can realize the data exchange between various dental medical devices with Bluetooth connection function produced by the equipment manufacturer.At the same time, through the Bluetooth app provided by the equipment supplier, the Bluetooth data interworking between the equipment and the terminal (such as mobile phone) can be realized.

The Bluetooth connection function is enabled as follows:



According to chapter 5.2.3 of this manual,the device enters advanced mode settings.
And then find for the Bluetooth function opening interface.

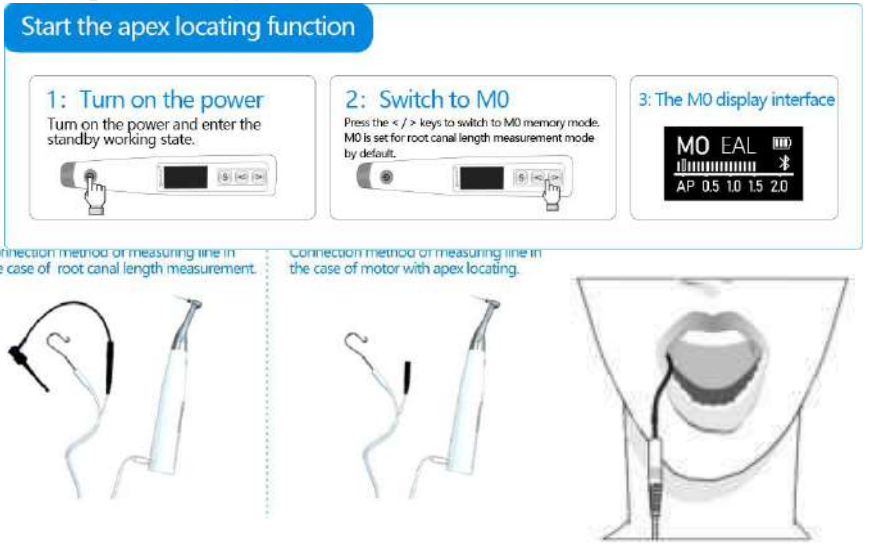
Press ‘<’、 ‘>’,it can control the status of Bluetooth function.

When the Bluetooth function is turned on, the Bluetooth icon will appear on each memory mode interface：



At the same time, the advanced mode setting also provides the MAC address of the Bluetooth function of the device.It is convenient for other devices to identify the physical address when searching the Bluetooth connection of the device.

Apex Locating function

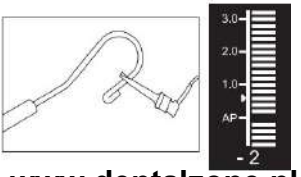


* M0 is the Apex Locating mode by default.It is necessary to connect the measuring wire with the file clip and the lip hook, and place the lip hook in the corner of the patient's mouth.

* Only Apex Locating function: Either socket of the measuring wire can be connected with file clip or lip hook.
* Endo preparation accompany with apex locating function :Connect the file clip plug into the socket (black) on the measuring wire. Connect the lip hook to the socket (white) on the measuring wire.

The measured numbers do not represent the actual length from the apical foramen. It simply indicates the file progression towards the apex. The digital number “00” indicate that the file has reached the apex foramen. Subtract 0.5-1mm from the measured file length as the working length. These numbers are used to estimate the canal’s working length.Accurate measurement is not always possible, especially in cases of abnormal or unusual root canal morphology. Make sure to take an X-ray to check the results.

Strongly recommend check the connection testing every time before use. Clip the holder onto lip hook and check that all the bars on the meter on the screen light up, otherwise, the measuring wire or file clip should be replace.



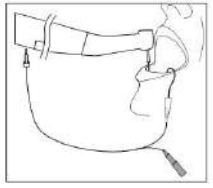
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Endo preparation accompany with apex locating function

When using motor combined canal measurement function, the measuring wire must be connecting with motor handpiece by USB socket, and white socket connects with patient's lip by lip hook, keep the black socket idle.

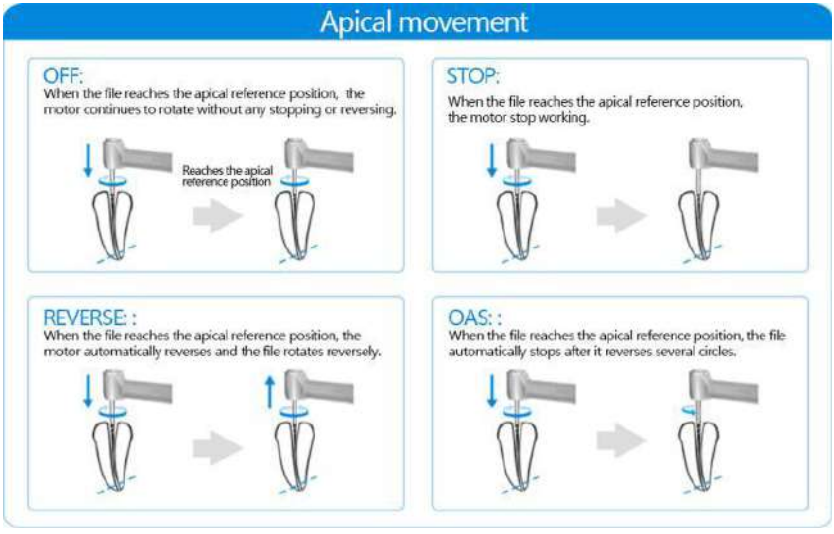
The canal length indicator bar will show on the screen.Setting parameters of automatic functions as needed, such as Apical Action, Auto Start, etc.





Apical action

Actions that happen automatically when the file tip reaches the point inside the canal determined by the Flash Bar setting.Benefit from integration of length determination, when the file reaches the reference point, the motor will response according to setting.**(OSA is only available for R-Smart Pro、R-Smart W-Pro)：**



Automatic start

This function is only effective in the mode of endo preparation accompany with apex locating.

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The automatic start function is on: When the root canal file enters the root canal, the motor starts automatically.

The automatic start function is off: when the root canal file enters the root canal, the motor will not start. At this time, the main switch ⏻ can only be used to start and stop the motor.

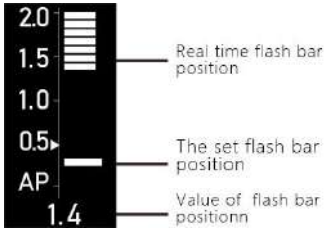
Automatic stop

This function is only effective in the mode of endo preparation accompany with apex locating.

After the automatic stop function is turned on, the root canal file is pulled out of the root canal, and the motor rotation stops automatically.

Flashing bar position

The position of the flashing bar represents the position of the apical reference point where various apical actions are triggered.
The scale and digital indication on the device screen do not represent a certain length or distance. The reduction of the number simply means that the root canal file moves towards the apex.



Apical slow down

When the root canal file approaches the physiological apex position, the motor rotation speed will automatically slow down.

Turn on apex slow down: the motor will automatically slow down near the apex position.

Turn off apex slow down: the motor will not slow down near the apex position.

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Root Canals not suitable for Electric Measurement

Root Canals not suitable for Electric Measurement

Accurate measurement cannot be obtained with the root canal conditions shown below.

Root canal with a large apical foramen

Root canal that has an exceptionally large apical foramen due to a lesion or incomplete development cannot be accurately measured. The results may show shorter measurement than the actual length.



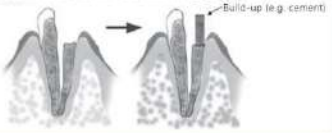
Root canal with blood overflowing from the opening

If blood overflows from the opening of the root canal and contacts the gums, this will result in electrical leakage and an accurate measurement cannot be obtained. Wait for bleeding to stop completely. Clean the inside and opening of the canal throughly to get rid of all blood, and then make a measurement.



Broken crown

If the crown is broken and a section of the gingival tissue intrudes into the cavity surrounding the canal opening, contact between the gingival tissue and the file will result in electrical leakage and an accurate measurement cannot be obtained. In thiscase, build up the tooth with a suitable material to insulate the gingival tissue.



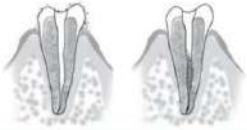
Extremely dry canal

If the canal is extremely dry, the meter may not move until it is quite close to the apex. In this case, try moistening the canal with cirydol or saline.



Cutting debris on tooth Pulp inside canal

Thoroughly remove all cutting debris on the tooth.
Thoroughly remove all the pulp inside the canal. Otherwise an accurate measurement cannot be obtained.



Caries touching the gums

In this case, electrical leakage through the caries infected area to the gums will make it impossible to obtain an accurate measurement.



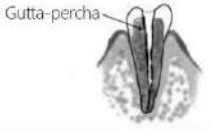
Fractured tooth Leakage through a branch canal

Fractured tooth will cause electrical leakage and an accurate measurement cannot be obtained.A branch canal will also cause electrical leakage.



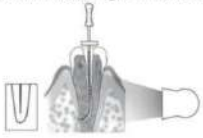
Re-treatment of a root filled with gutta-percha

The gutta-percha must be completely re-moved to eliminate its insulating effect. After removing the gutta-percha, pass a small file all the way through the apical foramen and then put a little saline in the canal,but do not let it overflow the canal opening.



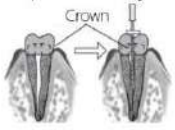
Endo Motor Reading and Radiography

An X-ray image might not show the apex correctly depending on the angle of the X-ray beam, and the location of the apex might seem to be other than it really is.



Crown or metal prosthesis touching gingival tissue

Accurate measurement cannot be obtained if the file touches a metal prosthesis that is touching gingival tissue. In this case, widen the opening at the top of the crown so that the file will not touch the metal prosthesis before taking a measurement.



Stop Working Status

When the root canal motor is rotating, in order to stop the motor rotation, the root canal motor can be stopped by pressing the main switch.



You can also find the automatic stop function setting interface by switching the function selection key,when the device run at the status of endo preparation accompany with apex locating.

POWER OFF



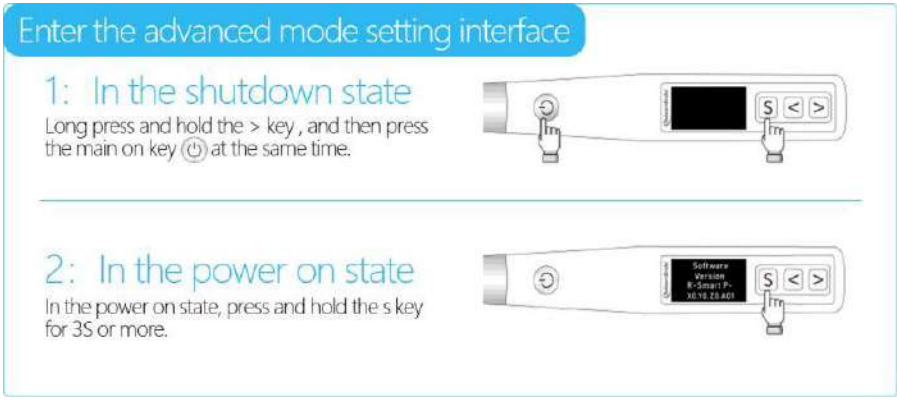
Firstly press the S key and then press the ⏻ key to turn off the power and stop working.

5.2.2 Preset file-parameter mode

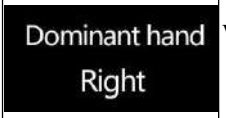
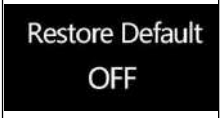
The operation of calling preset file-parameter can be refered to chapter 2.2.1 & 2.2.4 of this manual.

5.2.3 Advanced mode setting

The method to enter the advanced mode setting is as follows：(only available for R-Smart Pro、R-Smart W-Pro、R-Smart Expert、R-Smart W-Expert)



Press the S key in sequence to alternately display different advanced setting function interfaces:

Advanced setting function	Interface style	Function description
Software Version		The software version number is displayed on the advanced settings page: R-Smart P-X0.Y0.Z0.A01 Please contact the manufacturer for a version upgrade.
Dominant Hand		Set left and right habitual hands, When switching to the left-handed habit, the display interface will rotate 180°, which is convenient for the left-handed operator to observe the displayed content.
Beeper Volume		Adjust the volume, the volume can be set There are four gears from 0 to 3 class.
Restore Default		On/off factory default setting After restoring the factory settings, all parameters will be overwritten by the default parameters After the restoration is complete, the system will remind you that the setting is complete
Auto Standby Scr		Automatic return function, can automatically return to the main screen display in 5-60s
Start Up Memory		sed to set the standby screen memory mode entered each time the machine is turned on, Can be set to save the last operation "LAST" Or specify to save any memory mode M0-M15
Calibration		Turn on/off the automatic calibration function, the system will prompt after the calibration is completed.
Auto Power Off		The automatic shutdown time of the equipment can be set to 1-30min.
BLE ON/OFF		Bluetooth connectivity: ON/OFF
BLE MAC		MAC address of Bluetooth

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5.3 After Use

5.3.1 Regular Inspection

Maintenance and inspection are generally consider to be the duty and obligation of the user, but if, for some reason, the user is unable to carry out these duties, they may be performed by the accredited service personnel. Contact your local dealer or RebornEndo for details.

This instrument should be inspected every 6 months in accordance with the following maintenance and inspection items.

•Connect the AC adapter to the battery charger, plug it in and check that the Ready LED (green) lights up.

•Make sure there is no dirt, metal fragments etc. on the connection contacts for both the motor handpiece end and the battery charger.

•Put the motor handpiece into the battery charger and check that the Charge LED (orange) lights up. Check that the battery does not seem to be losing its charge too quickly.

•Check that the connection end of the motor handpiece is not damaged of dirty.

•Check that the connection end of the contra angle is clean and not damaged and that it can be properly connected to the motor handpiece.

•Check that the push button works and a file can be properly installed.

•Check that the external file electrode (option) clips onto the file properly and that it is not worn or damaged.

•Check that the instrument turns on when the Main switch is pressed, and that the instrument turns off when the Select switch is held down and the Main switch is pressed.

•Press the Set switch key to select a memory from M1-M17.

•Check that the settings for each of the memories can be changed.

•Make sure the file holder holds a file properly.

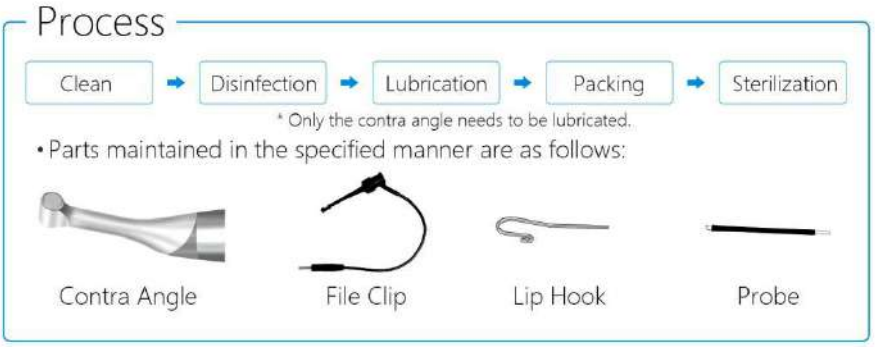
•Press the Main switch and make sure that this starts and stops the motor.

•Touch the root canal file with the lip hook and check whether all root canal length indicators on the display are lit.

•Run the motor in the optimal reciprocating motion mode and check if it changes the direction of rotation.

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5.3.2 Maintenance

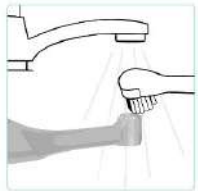


Parts of this equipment that are exposed/frequently in contact with patients need to be cleaned and sterilized by high temperature and high pressure from time to time according to the frequency of use. Items that need key maintenance include: handpiece, file clip, lip hook, probe, , etc.

The procedure is as follows (lubrication only needs to lubricate the bend head)：

Cleaning

The cleaning should be performed no later than 24 hours after the operation. The cleaning can be divided into automated cleaning and manual cleaning. Automated cleaning is preferred if conditions permit.



Disconnect the contra angle from the motor hand piece.Clean off the cutting，
Debris with running water and a soft brush and then wipe off the water.



Use a threeway syringe etc to blow out any moisture remaining inside the contra angle.

⚠CAUTION

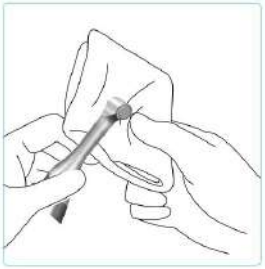
- If a medical agent being used for the treatment has adhered to thecomponents, wash it off in running water.
- Do not clean the components with an ultra sonic cleaning device.

⚠CAUTION

- Check to see if the contra angle including its inside, is completely dry.If any water remains inside the component, expel it with an air gun or another such tool. Failure to do so could result in the remaining water coming out during use and cause malfunction, or poor lubrication and steril -ization.
- If dust or other impurities enter the contra angle, they may cause poor rotation.

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Disinfection I



⚠CAUTION

- Do not use anything except Ethanol for Disinfection (Ethanol 70 to 80vol%). Do not use too much ethanol as it could seep inside and damage the contra angle.
- Do not immerse the components in or wipe it with any of the follo -wing:functional water (acidic electrolyzed water, strong alkaline solution, or ozone water), medical agents (glutaral, etc.), or any other special types of water or commercial cleaning liquids. Such liquids may result in metal corrosion and adhesion of the residual medical agent to the components.
- Never clean the contra angle, file holder, or contrary electrode with chemicals such as formalin cresol (FC) and sodium hypochlorite. These will damage the plastic parts of the components. If any of these liquids being applied to the components, wash it off in running water.
- Use only Ethanol for Disinfection (Ethanol 70 to 80 vol%) for cleaning. Any other cleaning chemical or products should not be used including but not limited to the following cleaning products and similar cleaning products listed below because of the potential damage to the plastic components.

Wipe the components with a piece of gauze that has been dampended with Ethanol for disinfection(Ethanol 70 to 80 vol%） and wrung out thoroughly. Disinfection must be performed no later than 2 hours after the cleaning phase. Automated disinfection is preferred if conditions permit.

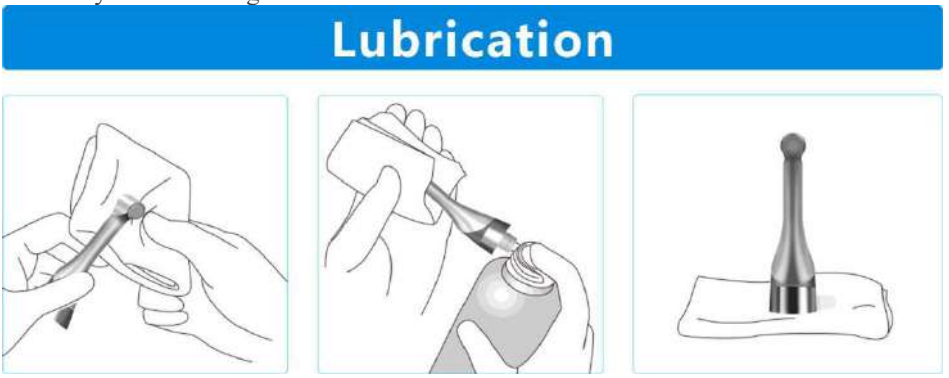
Operation Warning:

1. If any medication remains in the dental contra-angle, it may corrode or even cause the handpiece to malfunction.
2. It is forbidden to use liquid or spray cleaners directly on the equipment, especially the display.
3. Check and make sure the contra-angle is completely dry including inside. If any water remains in the handpiece, use an air gun or other tool to expel it. Failure to do so may result in poor lubrication or colonization of the contra-angle handpiece.
4. After use, all parts that have been exposed in the source of infection should be wiped with a soft cloth of 70-80 vol% ethanol.
5. Cleaning with chemical reagents may cause damage to the instrument.
6. For the motor handpiece, charging base, AC adapter, measuring wire and other accessories that are not in direct contact with the patient, only need to use 70-80 vol% ethanol to wipe and disinfect.

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Lubrication

Only the contra angle needs to be lubricated.



Cover the contra angle with a piece of gauze or other suitable cloth.

Screw the nozzle onto the spray can.Then insert it into the connection end of the contra angle, and spray for 2s. Using gauze etc to wipe excess spray off the outside of the contra angle.

Stand the contra angle up on a piece of gauze to allow all the excess spray to drain out.

❖ Warning：

① Before autoclaving, the contra angle must be lubricated with original spray of RebornEndo.

② Never direct the spray towards a person.

③ Never use the spray near an open flame.

④ Always shake the spary can two or three times before using it. Use the can in an upright position.

Sterilization

Besides the contra angle，lip hook,file clip,and probe ，any other components can not sterilize under high temperature and high pressure (134℃, 2.0bar~2.3bar (0.20MPa~0.23MPa)) .

Recommended temperature and time：

The Sterilization of contra angle is under 134℃, 2.0bar~2.3bar, at least for 10 mins.

The Sterilizations of lip hook,file clip,and probe are under 134℃, 2.0bar~2.3bar, at least for 4 mins.

Other Warming:

1. Wash the components completely before the sterilization.
2. Sterilization and drying temperature shall not exceed 134℃.
3. Follow other advice of the file manufacturer's for sterilization.

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Other parts of the device that aren't directly exposed or frequently contact the patient need to be sterilized according to the frequency of use. These accessories that only require disinfection and maintenance which include: motor handpiece, power adapters and charging bases, measurement wire, etc.

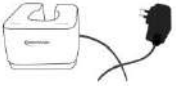
Process

Disinfection

•Parts disinfected in the specified manner are as follows:



Host handle

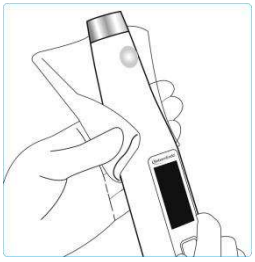


Adapter and charging base



Measuring line

Disinfection II



⚠CAUTION

• Do not use anything except Ethanol for Disinfection (Ethanol 70 to 80vol%). Do not use too much ethanol as it could seep inside and damage the contra angle.

• Do not immerse the components in or wipe it with any of the follo -wing:functional water (acidic electrolyzed water, strong alkaline solution, or ozone water), medical agents (glutaral, etc.), or any other special types of water or commercial cleaning liquids. Such liquids may result in metal corrosion and adhesion of the residual medical agent to the components.

• Never clean the contra angle, file holder, or contrary electrode with chemicals such as formalin cresol (FC) and sodium hypochlorite. These will damage the plastic parts of the components. If any of these liquids being applied to the components, wash it off in running water.

• Use only Ethanol for Disinfection (Ethanol 70 to 80 vol%) for cleaning. Any other cleaning chemical or products should not be used including but not limited to the following cleaning products and similar cleaning products listed below because of the potential damage to the plastic components.

Wipe the components of motor handpiece, battery charger base, AC adapter, measuring wire with a piece of gauze that has been dampended with Ethanol for disinfection(Ethanol 70 to 80 vol%） and wrung out thoroughly.

The method of disinfection II is only available for motor handpiece, battery charger base, AC adapter, measuring wire, etc.

The above components can not be cleaned with flow water. They are forbidden to sterilize under high temperature and high pressure.

No.	Failure	Possible cause	Solutions
1	No display of the screen when turn on the equipment	Low battery	Recharge in time

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No.	Failure	Possible cause	Solutions
2	The motor handpiece does not rotate.	1 The load of the file is greater than the set torque limit. 2 when using the mode of endo preparation accompany with apex locating function , operator connects the lip hook to the socket (white) on the measuring wire. 3 Chose EAL mode, EAL mode is only for canal measurement. 4 Strong resistance of contra angle.	1 Increase the setting torque. 2 Connect the file clip plug into the socket (black) on the measuring wire. Connect the lip hook to the socket (white) on the measuring wire. 3 Changing to CW, CCW, REC or ATR mode. 4 Clean or replace the contra angle.
3	The motor handpiece can not reverse automatically.	1 The mode of automatic reverse function not selected 2 The setting torque is too large	1 Please select a mode with automatic reversal function 2 Decrease the setting torque.
4	The motor handpiece reverses frequently.	1 The load of the file in the root canal is too large. 2 The root canal is too narrow. 3 The size of file is too thick. 4 Electromagnetic interference	1 Increase the setting torque. 2 Enlarge the root canal appropriatly. 3 Replace with the small size file. 4 Stay away from interference sources.
5	Motor rotate weakly	1 Low battery 2 The battery is broken 3 The battery is not installed correctly	1 Recharge in time 2 Replace the battery 3 Check the battery installation
6	The motor does not work when the file enters the root canal	1 Whether the lip hook is correctly hung at the corner of the patient's mouth 2 The equipment is set to apex positioning mode 3 The auto-start function is turned off	1 Connect the lip hook to the white end of the measurement wire and hang it at the corner of the patient's mouth 2 Set to operation mode other than apex positioning mode 3 Turn on the auto-start function
7	No sound	Beeper Volume set to 0. Vol.0: Mute.	Set Beeper Volume to 1,2,3.
8	The motor moves in the opposite	1 Whether the torque value is set too small	1 Increase the torque value appropriately

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No.	Failure	Possible cause	Solutions
	direction automatically	2 Whether the apical action is set to reverse mode 3 Whether the instrument is set to CCW mode	2 Set apical action to off or stop 3 Set the equipment to a mode other than CCW
9	Motor can not run in reverse	1 Whether the torque value is set too large 2 Whether the apical action is closed 3 Whether the equipment is not set to CCW mode	1 Decrease the torque value 2 Set the apical action to reverse 3 Set the equipment to CCW mode
10	The device shut down automatically.	1 Long time on the state of standby. 2 The battery is low.	1 Restart the device. 2 Battery charging.
11	Motor alternates between forward and reverse rotation	1 Select the REC mode and set the forward and reverse angle 2 Select the ATC/AIC mode and set the forward and reverse angle	1 Select a mode other than REC 2 Select a mode other than ATC/AIC
12	The device can not measure the root canal length.	1 The file clip and lip hook connect uncorrectly 2 The measuring wire is damaged. 3 Insufficient electrical conductivity between the shank and tail of the file	1 Connect the file clip and lip hook correctly. 2 replace a new one. 3 Use a file which is not conductive
13	Can not be charged	1 Using the wrong adapter 2 The adapter is not connected correctly	1 Please use the original adapter 2 Check if the adapter is connected correctly

* If there are any unsolvable problems, please contact us.

7 Safety precautions

7.1 Please carefully read this Instruction Manual before first operation.The manufacturer is not responsible if the user fails to follow the instructions or uses the device for other purposes.

7.2 Before use, run the device outside of the mouth to ensure it works normally.

7.3 Depending on the condition of the root canal of the tooth and the condition of the equipment, the root canal may not be shaped and measured correctly. Can be judged with X-rays.

7.4 The equipment may not work properly due to the following environmental factors:

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1) There are portable or removable RF transmitters around.

2) Electromagnetic interference may cause the device to operate abnormally.

7.5 As with all electronic devices, this equipment has electromagnetic interference and should not be used on patients with pacemakers or other implanted electronic devices.

7.6 Do not use damaged, bent, rusted and non-ISO 1797-1-compliant root canal files to avoid the risk of file breakage or flying out during use. Because the file can easily break due to metal fatigue and excessive load, the file should be replaced frequently

7.7 Pay full attention to whether there is looseness, vibration, noise and heat of the equipment, and please check the operation outside the patient's mouth in advance. If the device is seriously abnormal due to improper use or physical damage, please stop using it immediately and contact the local dealer or manufacturer. Only the device manufacturer can open the device for repair, and users are strictly prohibited from disassembling the device for repair.

7.8 Do not use excessive force even with reverse torque function, depending on the torque setting, the file may be damaged.

7.9 If resistance is encountered or automatic torque reversal is triggered, lift the file up by 3 or 4 mm and then carefully push it down into the canal again, or replace with a smaller file, Do not insert the file with excessive force.

7.10 Do not press the file down on the root canal or against the wall of the root canal, otherwise the file may be damaged.

7.11 Motor fault may result in the inability to properly control the operation of the equipment. It cannot be completely controlled by the equipment. Watch the display, listen to the sound and pay attention to the feedback.

7.12 Do not bump, especially avoid falling.

7.13 To avoid electric shock, do not insert other objects into the device.

7.14 During the cleaning process, avoid cleaning detergent enter the inside of the equipment to avoid short circuits and fault. Please wash the dental contra-angle after use and keep it clean. If any dirt soaks into the interior, it will cause the shaft core to vibrate or the clamping force of the collet to weaken.

7.15 When removing the dental contra-angle and root canal file, please turn off the power first. In order to avoid accidentally touching the switch on the motor handle, resulting in accidental start and personal injury.

7.16 When the battery level display on the screen flashes, please charge it in time.

7.17 Please use original accessories. Using non-original accessories, especially other dental contra-angles, power adapters or batteries, may cause the device unusable to use or damage the device.

7.18 The equipment is for professional use only, please follow local laws and regulations when handling equipment, batteries, accessories, packaging, etc.

7.19 Modification of this equipment is not permitted.

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7.20 Before each use, please check the equipment, if there is any damage to the equipment, do not use it. Continued use of damaged equipment may result in personal injury, adverse consequences, or serious hazards.

7.21 When charging or using, do not touch the charging port, battery and patient at the same time.

7.22 During the charging process of the device, it is forbidden to turn on the equipment.

7.4 This device requires special precautions regarding electromagnetic compatibility (EMC) and must be in strict accordance with the EMC information for installation and use. Do not use this equipment especially in the vicinity of fluorescent lamps, radio transmitting devices, remote control devices, handheld and mobile highfrequency communication devices.

7.5 Do not directly or indirectly place this device near heat source. Operate and store this device in reliable environment.

7.6 Please set torque and speed as per the recommended specifications of file manufacturer.

7.7 Any modification will render the guarantee void and may cause harm to the patient.

7.8 The guarantee is valid for normal usage conditions. Any disassembly will render the guarantee void, the professionals of RebornEndo company will offer the repair service during guarantee period.

7.9 Only the original adapter and lithium battery could be used to this machine.

7.10 Please remove the battery if the motor handpiece is not likely to be used for some time.

7.11 Please confirm whether the file is well installed and locked before starting the motor handpiece.

7.12 Please use original components, the components made by other companies may cause inaccurate measurement or un-measurable.

7.13 Before the contra angle stopping rotating, do not press the push cover of contra angle. Otherwise the contra angle will be broken.

7.14 Before the motor handpiece stopping rotating, do not remove the contra angle. Otherwise the contra angle and the gear inside motor handpiece will be broken.

7.15 When the indicating bar reaches the position of the dial 0.0, the endo file has reached the anatomical apical foramen. To guarantee the safety, the work length is clinically obtained by subtracting 0.5-1mm from the length measured by the device.

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