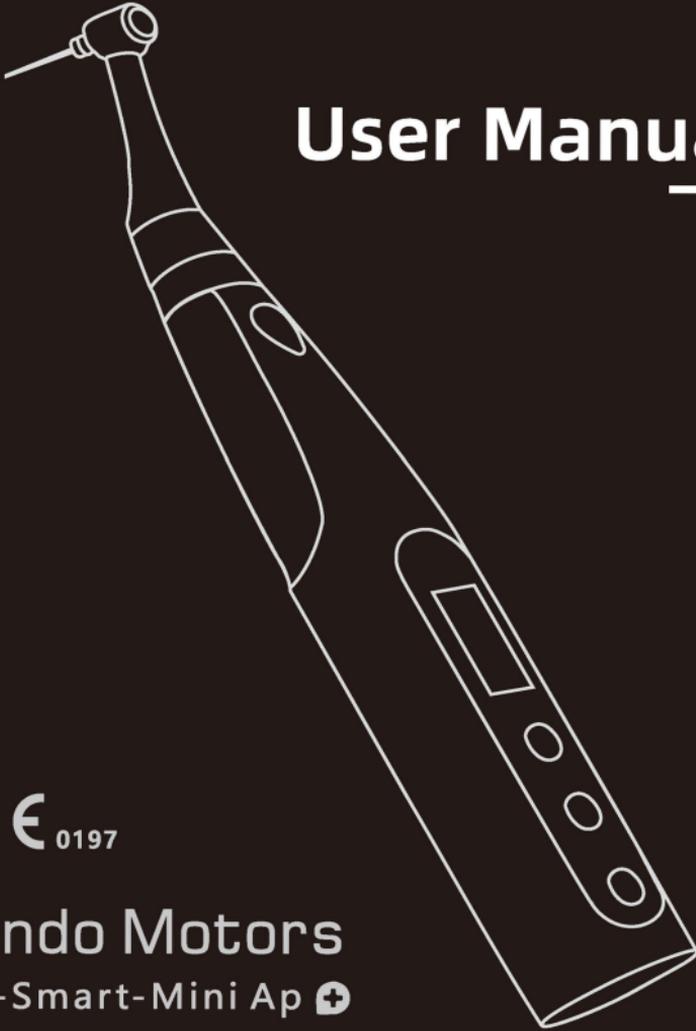


**COXO<sup>®</sup>**

# User Manual



**CE**<sub>0197</sub>

**Endo Motors**

C-Smart-Mini Ap 

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# 1. Safety



**Read the safety warnings carefully before using this instrument. These safety warnings will instruct you to better use this instrument.**

- 1) The instrument must be used within the scope mentioned in the manual. The manufacturer will not be held responsible if the user fails to follow the manual or uses this instrument for other purposes;
- 2) When using an external power supply, make sure that the voltage is within the voltage range indicated on the power AC adapter, otherwise it may cause injury to the operator or patient;
- 3) The use of non-original accessories, especially the use of other contra angle, AC adapter or batteries may be dangerous to the patient or operator, as well as causing damage to the instrument;
- 4) To avoid electric shock, do not insert other objects into the instrument;
- 5) Cleaning should be done in such a way that the cleaning agent does not enter the interior of the instrument to avoid short circuits and malfunctions;
- 6) File Clip must not come into contact with any metal body. For example, amalgam fillings or metal shell crowns on teeth must not come into contact with the oral mucosa.
- 7) If the instrument shows beyond the apex when the tip of the file has not reached the apex in the Apex Locator Function, it indicates or suggests the presence of dead pulp or other strong electrolytes in the root canal.
- 8) If the measurement readings are too low in the Apex Locator Function, check for over drying of the root canal on the one hand, and take an X-ray on the other hand for confirmation.
- 9) Check the instrument before use to make sure there are no abnormalities before use.
- 10) When improper use or physical damage causes serious abnormalities in the instrument, stop using it and turn it off immediately. Private modification of this instrument is strictly prohibited. If repairs are required, only the manufacturer and authorized dealers can open the instrument;
- 11) Use a file that meets the specifications and is in good condition. Otherwise, the file may break during operation and cause injury;

- 12) The instrument has electromagnetic interference, do not use it around patients with cardiac pacemakers. Do not use around electronic surgery.
- 13) Unstable voltages and the presence of electromagnetic fields can interfere with the normal operation of the instrument;
- 14) For disposal of the batteries and other accessories of this instrument, please observe local ordinances;
- 15) This instrument is for professional use only.
- 16) Incorrect replacement of lithium batteries causes unacceptable risks, and untrained personnel causes hazards (source) (such as overtemperature, fire or explosion). Users should not replace the battery without authorization.
- 17) The power AC adapter plug is a segmented instrument for grid power supply, and should not be placed in places where it is difficult to disconnect the instrument.
- 18) The instrument may exceed 41°C during operation, it is recommended to work for 5min and stop for 1min.
- 19) The instrument has a service life of 10 years for the Motor Handpiece, 5 years for the Contra Angle, 15,000 uses for the Measuring Wire, 250 uses for the File Clip, Lip Hook and Touch Probe, and the date of manufacture is detailed on the label.
- 20) Do not make any modifications to this instrument.

## 2. Intended use

- 1) The Endo Motors instrument is an endodontic treatment motorized handpiece with root canal measurement capability. It can be used to enlarge the canals while monitoring the position of the file tip inside the canal.
- 2) Removal and polishing of accretions / deposits on the surface of teeth and dental restorations ( fillings and prostheses , etc ).The instrument must only be used in hospital environments, clinics or dental offices, by qualified practitioners.

### 3. Contraindication

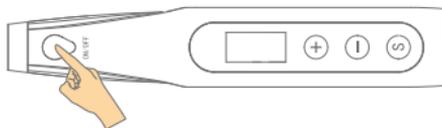
- If the patient has installed a pacemaker (or other electronic instrument) and has been warned not to use small appliances (such as electric shavers, hair dryers, etc.), it is recommended not to use this instrument;
- Patients with heart disease, pregnant women, and children should use with caution.
- This instrument cannot be used for the preparation of severely bent root canals;
- Do not use this instrument for dental implantation or other dental surgeries except for pulp.

### 4. Usage

#### 4.1 Power on/off

Long press the button **ON/OFF** to turn on the instrument.

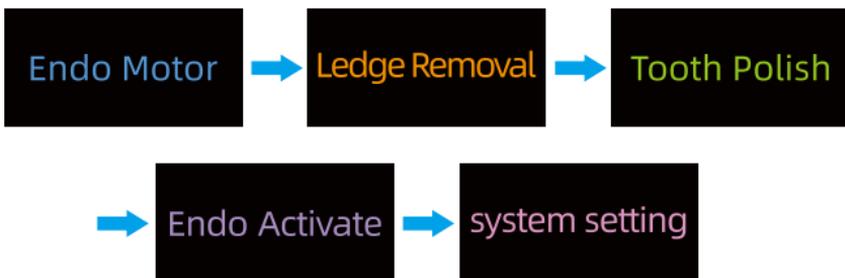
Long press the button **ON/OFF** to turn off the instrument.



#### 4.2 Function Switch

The device has 5 main functions to cycle through:

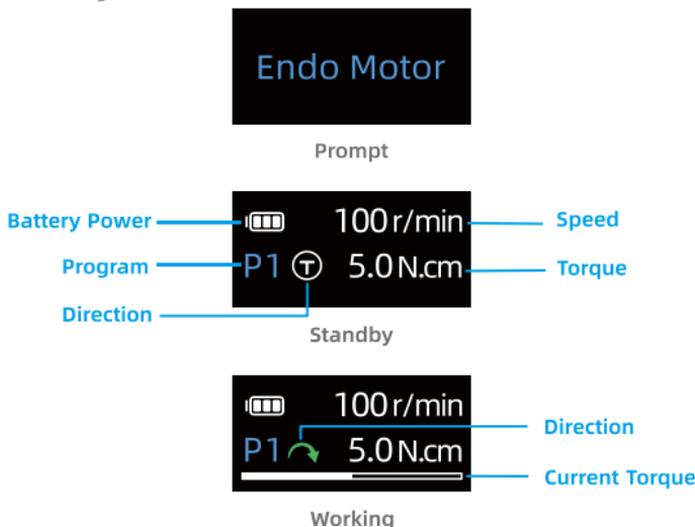
Long press the button **S** to select different functions.



## 4.3 Endo Motor Function

### 4.3.1 Endo Motor Function

If not any measuring wire connected to the instrument, it's in Endo Motor Function. Please refer to Fig.3.



#### 4.3.1.1 Connect the Components

##### 1) Connect contra angle

The contra angle is aligned with the motor handpiece and installed directly. The contra angle is correctly inserted into the handle. There will be a "click" sound when it is in place. The contra angle can be rotated 360° and inserted directly.

##### 2) Connect file

Hold down the push button on the contra angle and insert the file. Turn the file back and force 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

- The rod of the file must comply with the requirements of Type 1 rod in ISO 1797.
- According to the needs of root canal preparation, select a suitable file to prepare to the working length of the root canal. When selecting files, it is recommended to use them step by step from small to large, and try to use files of the same type but different specifications in combination.
- Make sure the connection ends of the motor handpiece and the contra angle is not damaged . If these are damaged , the load on the contra angle could cause the motor to reverse rotation, and this might result in an injury to the oral cavity;
- Contra angle is easy to be damaged by dropping, please place it carefully.
- Files are expendable, and they eventually wear out . Replace them before they break.
- Never use stretched, deformed or damaged files.
- Make sure the file is all the way in. Give the file a light tug to confirm it is securely held in place . If the file is not securely placed , it could come out and injure the patient.
- To install or disassemble file, please turn off the power first.
- To install or disassemble file,hold down the push button on the contra angle.Otherwise, it will damage the file.

### 4.3.1.2 Program selection and parameter setting

The endo motor function has nine Programs to choose: short press the button +/-, Programs can be set.

P1-P8: Rotary file or Reciprocating file, P9: Reverse file.

#### 1) Rotary Function:

Short press the button S into file category setting, press the button +/- select rotary, the motor will be in continuous forward motion.

Press the button S again to Switch speed, torque and reach torque, press the button +/- to adjust parameter.

Selection of reach torque:



Standby



Working

## 2) Reciprocating Function:

Short press the button S into file category setting, press +/- select reciprocating File, Press the button S again to switch speed, forward angle/reverse angle, press +/- to adjust parameter.



Standby



Working

## 3) Reverse Function:

Follow the steps below to adjust parameter.

Short press the button S to switch speed, press again +/- to adjust speed you need.



Standby



Working

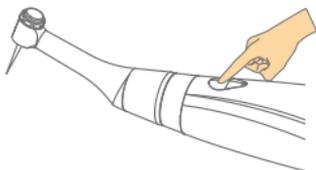
### 4.3.1.3 Save parameter

When adjust parameter, press the button ON/OFF or long press the button S can return standby. After 5 seconds of no-operation, the device will automatically exit the adjustment state and the changed parameter values will be saved automatically.

#### 4.3.1.4 Start working

##### 1) Start motor

Press the button **ON/OFF** to start the motor and press it again to stop it.



#### Warning

- If the contra angle's file release button is pressed against the teeth opposite the one being treated, the file could come out and injure the patient;
- Before use, run the instrument outside the oral cavity to make sure it is operating normally;
- Do not reach close to the motor connector while the motor is running to prevent pinching or scratching;
- Do not change the contra-angle handpiece or perform other connection operations while the motor is running;
- When the main button fails during operation, the motor can be urgently stopped by long pressing the button S .

#### 4.3.1.5 Stop/reverse/reciprocate when blocked

Under any of the programs P1-P8, the file category selects continuous rotation (forward rotation), which can be adjusted to different speeds and torques.

Motion

Rotary

Speed

300  
r/min

Torque

3.9  
N.cm

When reaching Torque, Stop/reciprocate/reverse can be selected.

- Stop: When the torque reaches the set torque in the working state, it will stop working and return to the standby state;

Reach Torque

⊕ Stop

- Reciprocate: after the torque reaches the set torque in the working state, it will carry out the set reciprocating action with equal angle, and resume positive rotation when the reciprocating torque is released to 60% of the set torque, if the torque is not released during the reciprocating action and the torque exceeds the protection threshold, it will trigger the overload protection, and the motor will stop working and return to standby state.

Reach Torque

⊕ Recipro.

Different angles can also be selected.

Angle

150°

- Reverse: after the torque reaches the set torque in the working condition, it will execute the set reciprocating action at the same angle, and resume positive rotation when the reciprocating torque is released to 60% of the set torque, if the torque is not released during the reciprocating action and the torque exceeds the protection threshold, overload protection will be triggered, and the motor will stop working and return to standby state.

Reach Torque

⊕ Reverse

- If the load reaches the preset torque limit or the position reaches the root tip setting during motor operation, the motor will automatically stop/reverse/reciprocate. When the load decreases and exits the root tip position, the motor automatically resumes forward rotation.



## Caution

Do not apply excessive load to the root canal enlargement file during motor operation as this may cause damage to the file.

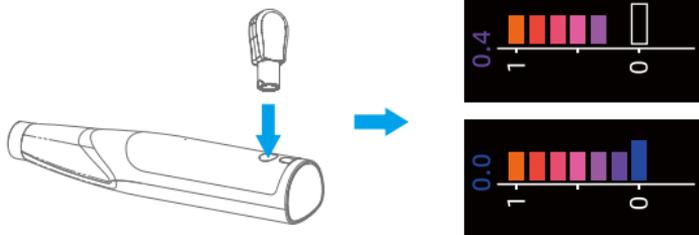
### 4.3.2 Apex Locator Function

While the Measuring wire is connected to the instrument, the instrument enters the Apex Locator Function automatically. Please refer to Fig.4.

#### 4.3.2.1 Check Root canal measurement performance

##### 1) Check with Tester

Connect the tester to the measuring wire jack on the back of the motor handpiece. Check that the canal length indicator bars light up between number 0.0 and number 0.5.



## Caution

If the canal length indicator bars does not light up between number 0.0 and number 0.5, an accurate measurement cannot be made. In this case, stop using the instrument immediately and have it repaired.



## Note

If the results of the basic function check of the device are normal, proceed to check the measuring line function.

## 2) Check Canal Measurement Function

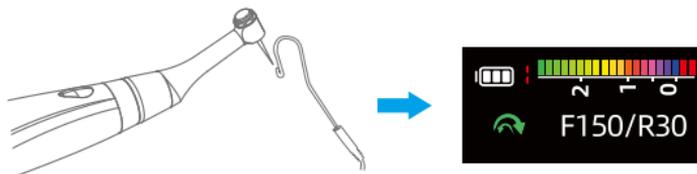
Touch the lip hook with the clip on the end of the file clip and check that all the flash bars on the meter in the display light up.



### Caution

Check the instrument's function before use with each patient. If all the indicator bars do not light up, an accurate measurement cannot be made. In this case, stop using the instrument immediately and have it repaired.

In compound mode, insert the measuring wire with connected lip hook into the device and contact the lip hook with the root canal enlargement file on the contra-angle handpiece, the number of grids on the screen shows full grids and the color of the grids is orange-red, which indicates that the function of the measuring wire is normal.



### Caution

When the lip hook is in contact with the file clip or the lip hook is in contact with the root canal enlargement file, the number of grids on the screen does not show full grids, indicating that the measuring wire is not functioning properly, please contact your local distributor or contact the manufacturer directly for assistance.

#### 4.3.2.2 Connect the Components

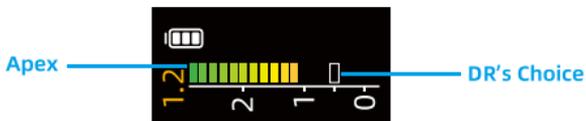
- 1) Connect Lip Hook, File Clip
- 2) Connect Contra Angle Silicone Covers, Contra Angle
- 3) Connect file
- 4) Connect Measuring Wire



#### Caution

- When clipping the file clip onto the metal part of a file or reamer, clip the file clip onto the metal shaft near the handle. Do not clip it onto the cutting part or transition part of the file or reamer. This will cause the file clip to wear out very quickly;
- Do not bang or bump the plugs when they are inserted;
- Do not use damaged or deformed file;
- Do not wrap the measuring wire around the instrument.

#### 4.3.2.3 Screen display



#### 4.3.2.4 Measurement

Hang the lip hook on the patient's lips, which should be placed in the opposite direction of the teeth to be measured.



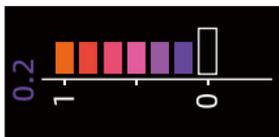
#### Warning

- Check that the lip hook and file clip are properly connected; incorrect connections will result in inaccurate measurements;
- Lip hook may cause adverse reactions in patients with metal allergies; ask the patient if he/she has any metal allergies before use;
- Do not use medicinal solutions such as formalin cresol or sodium hypochlorite in contact with the lip hook, as they are prone to adverse reactions in patients.

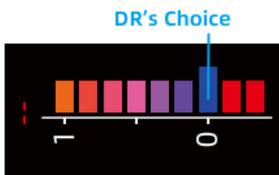
1) Slowly insert the measuring file into the canal. Bar in meter show the location of the file tip.



- There is no sound when the file tip reaches above 2.0.
- There is slow beeping sound when the file tip reaches 1.0-2.0.
- The beeping sound Interval become frequently when the file tip reaches 0.5-1.0.



- There is fast beeping sound when the file tip reaches 0.0-0.5.



- A sustained beep sounds when the file tip reaches or exceeds the DR's CHOICE.



### Caution

- In some cases such as a blocked root canal, a measurement cannot be made; (refer to chapter 4);
- When a file enters the root canal and the screen never shows the position of the file, the instrument may be malfunctioning;
- The scale shown in the screen does not indicate a specific size.



### Note

When the measuring Wire is connected, short press +/- switches the function to Multi-function.

#### 4.3.2.5 Set the DR's Choice

This feature enables to mark an individual predetermined reference position at the required distance from the apex.

When DR's CHOICEapical arrow is set, clear visual and audio indication is given that the file has reached this pre-selected position.

**Follow these steps to adjust:**

**Step 1:** Press the button S the apex setting icon becomes adjustable;



**Step 2:** Press the button +/- to adjust the DR's Choice. (Long press for quick adjustment);



**Step 3:** The changed value will be saved automatically. Press the button ON/OFF to exit the setting, or exit the setting automatically after a few seconds.



#### Note

DR's Choice can be cycled through the 1-0 range with position options of 1.0, 0.9, 0.7, 0.5, 0.4, 0.2, 0.0.

### 4.3.3 Multi-function

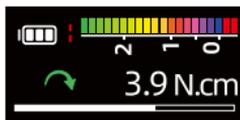
#### 4.3.3.1 Component Connection

Connect the lip hook, file clip and measuring wire, contra angle and file and short press +/- or ON/OFF button to enter the Multi-function, refer to Fig.3 and 4 for the connection of each component.

#### 4.3.3.2 Screen display



Standby



Working

#### 4.3.3.3 Program and parameter setting (refer to chapter 4.3.1.2)

#### 4.3.3.4 Apical auto-reverse/reciprocate/stop (refer to chapter 4.3.1.5)



#### Note

- When the file tip reaches the DR's Choice, the motor will automatically reverse, and when the file tip moves away from the DR's Choice, the motor will automatically resume forward rotation;
- When the file tip reaches the DR's Choice, the motor will automatically reciprocate, and when the file tip moves away from the DR's Choice, the motor will automatically resume forward rotation;
- When the file tip reaches the DR's Choice, the motor will automatically stop, and when the file tip moves away from the DR's Choice, the motor will automatically resume rotation.

#### 4.3.3.5 Auto start/stop



#### Note

When the file is inserted into the canal, the motor will automatically start, exit the canal, it will stop.

#### 4.3.3.6 Auto slowdown



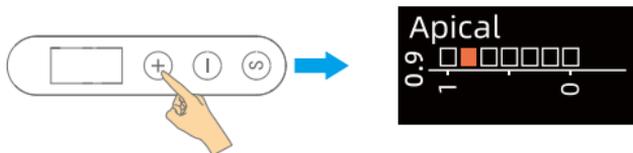
#### Note

When the file tip reaches the position "1", the motor will automatically slow down decelerate to 100r/min to run, and return to normal speed to continue running when exiting the set apical position.

#### 4.3.3.7 Set the DR's CHOICE and Change Speed,Torque and Angle

Press button S to enter speed adjustment, switch between Torque, Angle and DR's CHOICE.

1) Set the DR's CHOICE, press button +/-.



2) Change Speed,Torque and Angle (refer to section 4.3.1.5 ).

#### 4.3.3.8 Start working (refer to section 4.3.1.4 )

Make sure the lip hook in the corner of the patient's mouth,start working.

## 4.4 Ledge Removal Function

Simulate manual crossing of ledge through equal angle reciprocating motion, further ledge removal.This mode contains 5 built-in programs.

### 4.4.1 Connect Component

Connect contra angle and file,Please refer to Fig.3.



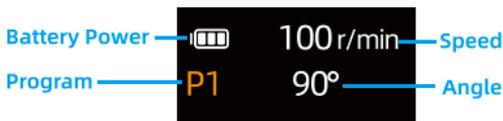
#### Note

Long press button S to switch modes.

### 4.4.2 Screen display



Prompt



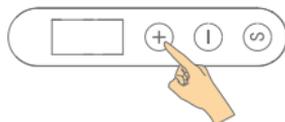
Standby



Working

### 4.4.3 Introduction and Selection of Programs

- Ledge Removal has 5 User-defined programs: P1-P5.
- Press button +/- to switch programs.



### 4.4.4 Change Speed and Angle

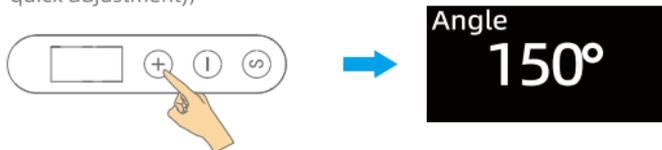
Ledge Removal has P1-P5, users can set speed and angle.

**Follow these steps to adjust:**

**Step 1:** Short press button S to enter speed adjustment, press button S again to switch to angle adjustment;



**Step 2:** Press button +/- to adjust the desired speed or angle value; (long press for quick adjustment);



**Step 3:** The changed value will be saved automatically. Press the button ON/OFF or long press button S to exit the setting, or exit the setting automatically after a few seconds.



### 4.4.5 Start working(refer to section 4.3.1.4)



#### Note

Due to this mode's equal angle reciprocating motion, there is no reverse rotation.

## 4.5 Tooth Polish Function

### 4.5.1 Connect the Components

- 1) Connect contra angle.
- 2) Connect dental prophy cup.



#### Warning

- The rod of the dental prophy cups must comply with the requirements of Type 1 rod in ISO 1797.
- The dental prophy cups must comply with the requirements of ISO 21671: 2006 standard. Damaged or deformed dental prophy cups cannot be used.
- Before use, please disinfect the dental prophy cups according to its manufacturer's instructions. The used prophy cup is treated as medical waste and cannot be reused.
- The installation and disassembly of dental prophy cups must be carried out with the motor completely stationary.
- Ensure that the dental prophy cups is installed in place, otherwise it may damage the Contra angle or causing a flying out accident.

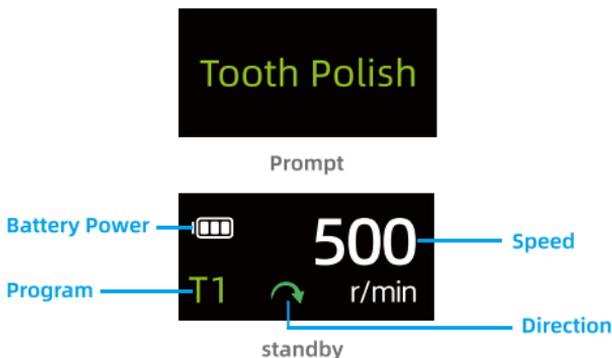
### 4.5.2 Mode and Display

There is only one mode: Tooth Polish.



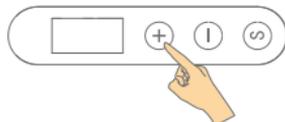
#### Note

Long press button S to switch modes.



### 4.5.3 Introduction and Selection of Programs

- It's a featured extension, this model simulates the operating characteristics of a pneumatic dental polisher;
- Tooth Polish has 5 User-defined programs: T1-T5 (T1-T3 rotary; T4-T5 reverse)
- Adjustable parameters: speed (500-2500r/min, 500 steps);
- Press the button +/- to switch programs.

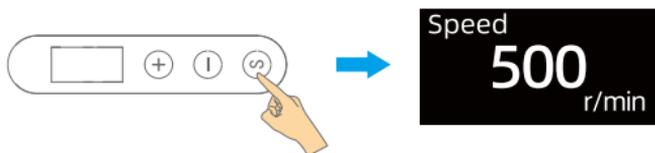


### 4.5.4 Change Speed

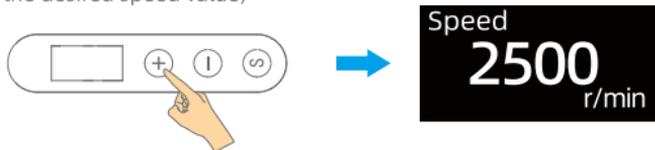
Tooth Polish has T1-T5, users can set speed.

**Follow these steps to adjust:**

**Step 1:** Short press button S to enter the speed adjustment;



**Step 2:** Press button + to increase the desired speed value; Press button - to reduce the desired speed value;



**Step 3:** The changed value will be saved automatically. Press the button ON/OFF or long press button S to exit the setting, or exit the setting automatically after a few seconds.

### 4.5.5 Start working (refer to section 4.3.1.4)

## 4.6 Endo Activate Function

### 4.6.1 Connect the Components

Users need to replace the special endo activator contra angle.

- 1) Connect contra angle;
- 2) Put the disposable protective sleeve on the outside of the contra angle;
- 3) Connect dental irrigation needle.



#### Warning

- Please use standardized irrigation needle. The use of bent, cracked, deformed, damaged or out-of-specification irrigation needle may result in injuries such as sudden breakage or flying out of the irrigation needle during the rotation process.
- When using a irrigation needle, it is necessary to know whether the specifications of the irrigation needle are compatible with the use of bending machine.
- During the treatment operation, it should be ensured that there is sufficient liquid in the endodontic treatment. It is strictly forbidden to use the device in a dry root canal.
- During the treatment procedure, the contra angle needs to be placed in a disposable protective sleeve to work.
- Disposable protective sleeve are for single use only. If the irrigation needle and disposable protective sleeve are used incorrectly, the patient will be at risk of cross-infection

### 4.6.2 Mode and Display

There is only one mode: Endo Activate.



#### Note

Long press button S to switch modes.



Prompt

Battery Power



Program

A1

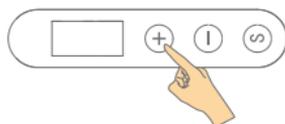
2000  
r/min

Speed

standby

### 4.6.3 Introduction and Selection of Programs

- It is a featured extension device, replacing the special endo activator contra angle, for root canal area scaling of teeth;
- Endo Activate has 2 User-defined programs: A1-A2;
- Adjustable parameters: speed (2000,6000,10000,15000r/min);
- Press the button +/- to switch programs.

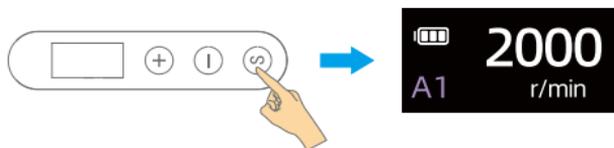


### 4.6.4 Change Speed

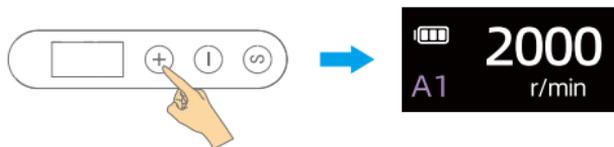
Endo Activate has A1-A2, users can set speed.

**Follow these steps to adjust:**

**Step 1:** Short press button S to enter the speed adjustment;



**Step 2:** Press button + to increase the desired speed value; Press button - to reduce the desired speed value;



**Step 3:** The changed value will be saved automatically. Press the button ON/OFF or long press button S to exit the setting, or exit the setting automatically after a few seconds.

### 4.6.5 Start working (refer to section 4.3.1.4 )

## 4.7 System setting

### system setting

To modify User Program parameters from the stand-by state:

1. To select the desired parameter, press the button S.
2. To adjust the parameter setting, press the button +/-.
3. Press the button S or wait 5 seconds to confirm.

<div style="background-color: black; color: white; padding: 5px; text-align: center;">Calibration Start</div> <div style="background-color: black; color: white; padding: 5px; text-align: center;">Calibration Loading...</div>	<div style="background-color: black; color: white; padding: 5px; text-align: center;">Calibration OK</div> <div style="background-color: black; color: white; padding: 5px; text-align: center;">Calibration NG</div>	<p>The motor will run automatically; When calibration is complete, the motor stops running.</p>
<div style="background-color: black; color: white; padding: 5px; text-align: center;">Screen Left Right</div>	<p>The device can be adjusted for left-handed or right-handed user (180° rotation of the display).</p>	
<div style="background-color: black; color: white; padding: 5px; text-align: center;">Auto wake up ON OFF</div>	<p>Set Auto Wake Up ON: Holding to auto Power on again within auto power off 30 minutes; OFF: Auto power off with 3 minutes no operation.</p>	
<div style="background-color: black; color: white; padding: 5px; text-align: center;">Apical Action ON OFF</div>	<p>Set Apical Action ON: Enable section (refer to 4.3.3.4/4.3.3.5/4.3.3.6 setting); OFF: Disable section (refer to 4.3.3.4/4.3.3.5/4.3.3.6 setting).</p>	
<div style="background-color: black; color: white; padding: 5px; text-align: center;">Auto slowdown ON OFF</div>	<p>Set Auto Slowdown ON: Refer to section 4.3.3.6; OFF: Disable Auto Slowdown.</p>	
<div style="background-color: black; color: white; padding: 5px; text-align: center;">Auto start/stop ON OFF</div>	<p>Set Auto Start ON: Refer to section 4.3.3.5; OFF: Disable Auto Start (the Main button is needed to start the motor handpiece).</p>	



## Caution

- Connect the contra angle before calibration;
- The screen displays "OK", indicating that the instrument is functioning normally;
- The screen displays "NG", indicating that the instrument is not operating properly. Please contact your local dealer or contact the factory directly for assistance;
- Do not touch the file or apply pressure to the motor, otherwise the calibration will fail.

## 5. Battery and Charging

### 5.1 Battery Power

The number of bars shows how much power is left:



## Note

Charge the battery as soon as the indicator gets down to only one bar.

### 5.2 Battery Charging

Refer to Fig. 5

- 1) Connect the power AC adapter to the charging base and connect the AC adapter plug to the power outlet, the light on the charging base will turn on after the connection is completed;



## Warning

- Always use the AC adapter that comes with the instrument. Using another AC adapter can result in electric shocks, malfunctions, fires, etc.
  - The charger and its AC adapter must be located at least 2 meters away from the patient.
  - Do not use the battery charger for any instrument except the instrument.
- 2) Put the motor handpiece all the way into the charging base. The light (orange) will rotate on and start charging;

- 3) When the battery is fully charged, the light(orange) goes out and the light (green) will light up.



### Warning

- Do not touch the AC adapter if there is lightening while the battery is being charged. This will result in an electric shock.
- Do not use the battery charger in a place where it might get wet.
- Do not connect measuring wire, tester, etc. when charging the instrument;
- When the instrument is finished charging, disconnect the AC adapter from the power supply and pull out the AC adapter connector.

## 5.3 Replacement Battery

Refer to Fig.6

Replace the battery if it seems to be running out of power sooner.

- 1) Turn the power off.
- 2) Use tweezers to open the rubber cover and then remove the screw.
- 3) Remove the battery cover.
- 4) Remove the old battery and disconnect the connector.
- 5) Connect the new battery and put it in the motor handpiece. (Align the protruding surface of the wire plug of the new battery with the groove surface of the white battery socket and insert it, and fix the battery in place.)
- 6) Install the cover and its screw.



### Warning

- Use only battery designed for the instrument. Other batteries could cause overheating;
- Do not use a battery if it is leaking, deformed, discolored or if its label is peeled off. It might overheat;
- Do not replace the battery with wet hands, as this may result in short-circuiting of the battery and leakage of liquid into the instrument;
- Old batteries must be recycled and disposed of in accordance with local regulations;
- When the instrument is not used for a long period of time, it is recommended to charge it regularly for maintenance. For example, charging at least once a month.

## 6. Cleaning, Disinfection and Sterilization

<b>Device</b>	<p>Contra angle, File clip, Lip hook, Motor handpiece, Charging Base, Measuring Wire, AC adapter, Contra angle silicone Covers.</p> <p>The procedure for cleaning, disinfection and sterilization applies only to the accessories Contra angle, File clip, Lip hook, Contra Angle Silicone Covers.</p>
<b>ADVICE</b>	<p>Reprocessing procedures have only limited implications to a surgical instrument. The limitation of the numbers of reprocessing procedures is therefore determined by the function / wear of the device. There is no limit of maximum allowable reprocessing cycles. The device should no longer be reused in case of signs of material degradation.</p> <p>In case of damage the device should be reprocessed before sending back to the manufacturer for repair.</p>
<b>Reprocessing Instructions</b>	
<b>Preparation at the Point of Use</b>	<p>Disconnect the Contra angle from handpiece, the File clip from the measuring wire and the Lip hook. Remove gross soiling of the instrument with cold water (&lt;40°C) immediately after use. Don't use a fixating detergent or hot water (&gt;40°C) as this can cause the fixation of residuals which may influence the result of the reprocessing process.</p> <p>Store the instruments in a humid surrounding.</p>
<b>Transportation</b>	<p>Safe storage and transportation to the reprocessing area to avoid any damage and contamination to the environment.</p>
<b>Preparation for Decontamination</b>	<p>The devices must be reprocessed in a disassembled state. Only Contra-angle, File clip, Lip hook, Contra Angle Silicone Covers can be cleaned and disinfected with automated methods and sterilized with steam sterilization process.</p> <p>Do not sterilize the Motor handpiece and AC adapter. The Motor handpiece and AC adapter cannot be cleaned and disinfected in a washer/disinfector. For these parts, only general wipe decontamination is possible!</p>
<b>Decontamination of other parts than Contra-angle, File clip, Lip hook, Contra Angle Silicone Covers</b>	<p>After operation, take out the Motor handpiece and AC adapter on the work bench.</p> <p>Soak a soft cloth completely with distilled water or deionized water, Decontamination and wipe all the surfaces of these components, until the surface of the parts the components is visually clean.</p> <p>For decontamination, soak a dry soft cloth with 75% alcohol or other contra-angle, File clip, disinfects which are approved for its efficacy by VAH/DGHM-LISTING-Liphook and CE marking, FDA and Health Canada Approval lighting device:</p> <p>Wipe all surfaces of Motor handpiece, AC adapter and other components with the wet soft cloth for about 3 minutes. Please follow the instructions of manufacturer of disinfectant swipe the surface of the component with a dry soft lint-free cloth.</p>

<p><b>Pre-Cleaning</b></p>	<p>Following instruction are only relevant for Contra angle, File clip, Lip hook, Contra Angle Silicone Covers!          Not use automated cleaning, disinfection and sterilization for other parts than Contra angle, File clip, Lip hook, Contra Angle Silicone Covers in this system!          Do a manual pre-cleaning, until the instruments are visually clean. Submerge the instruments in a cleaning solution and flush the lumens with a water jet pistol with cold tap water for at least 10 seconds.          Clean the surface with a soft bristol brush.</p>
<p><b>Manual Cleaning (For US)</b></p>	<p>Recommend using 3M mutienzyme cleaning agent at a concentration of 5mL/1L distilled water.</p> <ul style="list-style-type: none"> <li>• Soak the soft cloth in detergent and wring it out.</li> <li>• Wipe the outer surface of the handpiece with the soft cloth.</li> <li>• Clean the chuck, gaps and threads: brush back and forth with a soft brush under running tap water to remove contaminants.</li> <li>• Rinse handpiece with tap water until all visible contaminants have been removed.</li> <li>• Remove any liquid residue with a lint-free cotton cloth, then dry at 30°C.</li> <li>• Checked that if the devices were clean or broken after cleaning. If the cleaning is not good enough, repeat the cleaning procedure.</li> <li>• Do not put a handpiece into a container containing a cleaning solution. If the internal liquid is not cleaned and the drying is incomplete, the internal parts may be corroded.</li> </ul>
<p><b>Automated Cleaning (For EU)</b></p>	<p>Regarding cleaning/disinfection, rinsing and drying, it is to distinguish between manual and automated reprocessing methods. Preference is to be given to automated reprocessing methods, especially due to the better standardizing potential and industrial safety.</p> <p>Automated Cleaning:          Use a washer-disinfector meeting the requirements of the ISO 15883 series.          Put the instrument into the machine on a tray. Connect the instrument with the WD by using suitable AC adapter and start the program:</p> <ul style="list-style-type: none"> <li>• 4 min pre-washing with cold water (&lt;40°C)</li> <li>• Emptying</li> <li>• 5 min washing with a mild alkaline cleaner at 55°C</li> <li>• Emptying</li> <li>• 3 min neutralizing with warm water (&gt;40°C)</li> <li>• Emptying</li> <li>• 5 min intermediate rinsing with warm water (&gt;40°C)</li> <li>• Emptying</li> </ul> <p>The automated cleaning processes have been validated by using 0.5% neodisher MediClean forte (Dr Weigert) Note Acc to en ISO 17664 no manual reprocessing methods are required for these devices. If a manual reprocessing method has to be used, please validate it prior to use.</p>

<b>Automated Disinfection (For EU)</b>	<p>Automated Disinfection: Automated Thermal Disinfection in washer/disinfector under consideration of national requirements in regards to A0-Value (see EN 15883). A disinfection cycle of 5 min disinfection at 93°C has been validated for the device to achieve an A0 value of 3000.</p>
<b>Manual Drying (For US)</b>	Use compressed air to blow dry the internal pipes and external surfaces separately.
<b>Automated Drying (For EU)</b>	<p>Automated Drying: Drying of outside of instrument through drying cycle of washer/disinfector. If needed, additional manual drying can be performed through lint free towel. Insufflate cavities of instruments by using sterile compressed air.</p>
<b>Functional Testing, Maintenance</b>	<p>Visual inspection for cleanliness of the instruments and reassembling. Functional testing according to instructions of use. If necessary, perform reprocessing process again until instrument is visibly clean. Defective accessories should be immediately discarded. The defects include: plastic deformation and corrosion Maintenance is not required. Instruments oil must not be used</p>
<b>Packaging</b>	<p>Pack the instruments in an appropriate packaging material for sterilization. The packaging material and system refer to EN ISO 11607. (For US) Please the sterilization bags which are approved for its efficacy by FDA. Recommended sterilization bag: SIGMA Sterilization Pouch and Roll 510(k) Number: K202462.</p>
<b>Sterilization (For US)</b>	<p>Sterilizable parts: Contra angle, File clip, Lip hook, Contra Angle Silicone Covers Sterilization method: Gravity-Displacement Steam Cycle Sterilization conditions: 135°C, 10 minutes Drying Time: 30 minutes</p>
<b>Sterilization (For EU)</b>	<p>Sterilization of instruments by applying a fractionated pre-vacuum steam sterilization process (according to EN 285 / EN 13060 / EN ISO 17665) under consideration of the respective country requirements. Minimal requirements: 3 min at 134 °C In EU, 5 min at 134 °C is required. Maximal sterilization temperature: 137°C</p>
<b>Storage</b>	Storage of sterilized instruments in a dry, clean and dust free environment at modest temperatures refer to label and instructions for use.
<b>Reprocessing validation study information</b>	The above-mentioned reprocessing process (cleaning, disinfection sterilization) has been successfully validated.
<b>Additional Instructions:</b> None	
It is the duty of the user to ensure that the reprocessing processes including resources, materials and personnel are capable to reach the required results. State of the art and often national law requiring these processes and included resources to be validated and maintained properly.	

## Introduction

Thank you for purchasing the instrument.

For optimum safety and performance, read this manual thoroughly before using the instrument and pay close attention to warning and notes.

Keep this manual in a handy place for quickly and easy reference.

We reserve the right to make updates and upgrades to this manual and the products described herein without notice.

**Fig. 1 Components and accessories**



**Motor Handpiece**



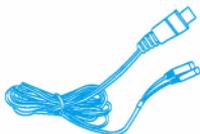
**Charging Base**



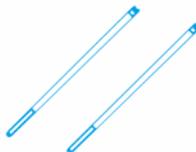
**Contra Angle**



**File Clip**



**Measuring Wire**



**Touch Probe**



**Lip Hook**



**AC adapter**



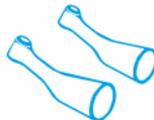
**Tester**



**Wrench**

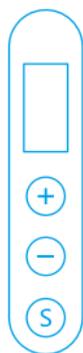
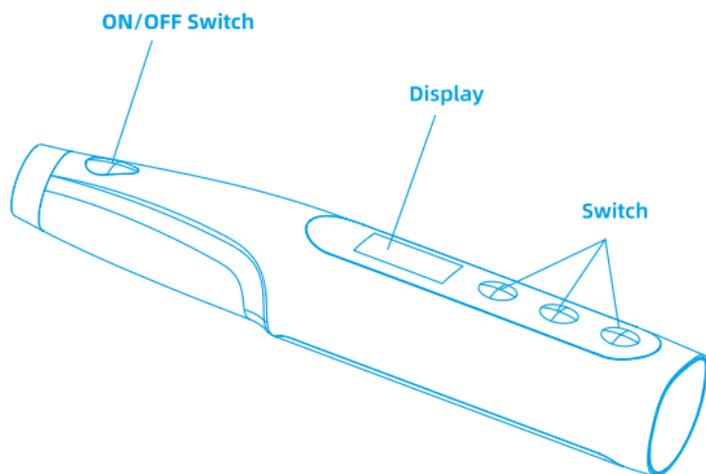


**Spray Nozzle**



**Contra Angle Silicone Covers**

**Fig. 2 Handpiece and Switch**



Adjust Switch

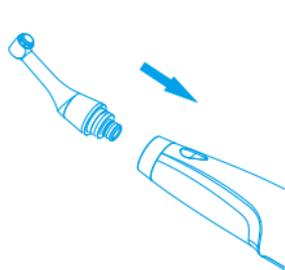


Adjust Switch

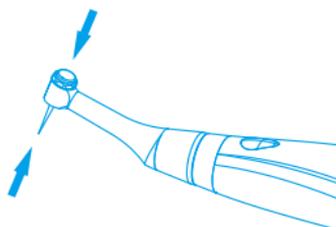


Select/Set Switch

**Fig. 3 Contra Angle & File connection**



**Connect Contra Angle**



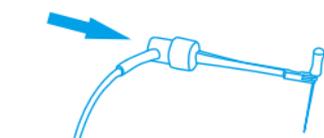
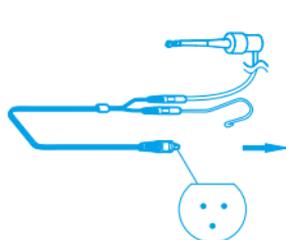
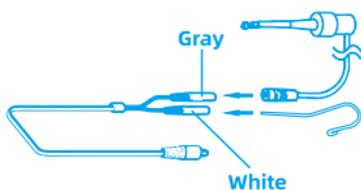
**Connect file**



**Warning**

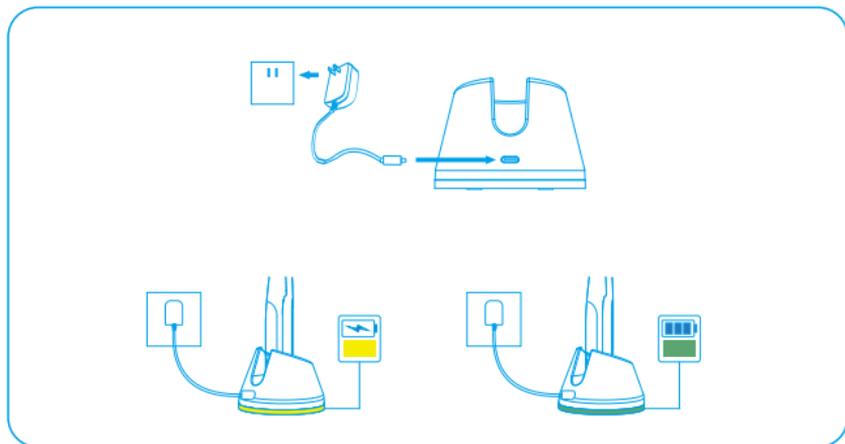
- 1) Do not reach near the motor connector while the motor is running to prevent pinching or scratching.
- 2) Do not change the handpiece or perform other connection operations while the motor is running.

**Fig. 4 Measuring Wire connection**

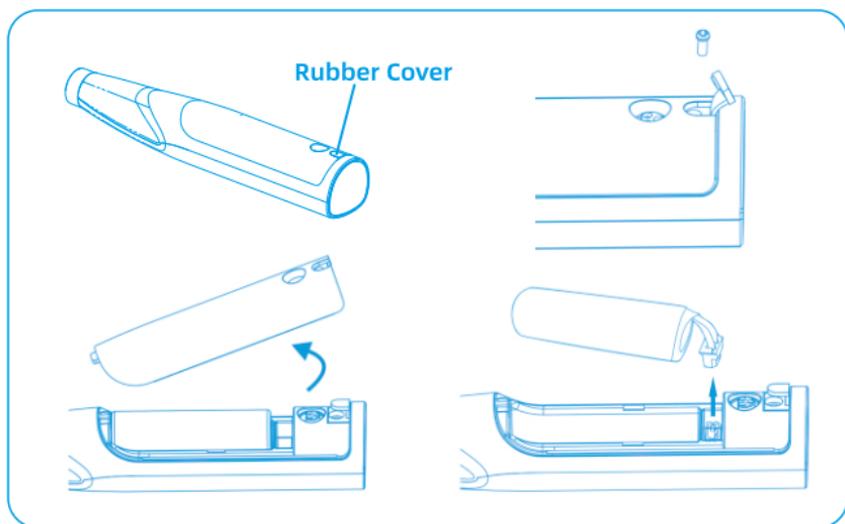


**Measuring Wire Jack**

**Figure 5 Charging**



**Figure 6 Replace the Battery**



## 7. Operating, Transport and Storage Environment

### Operating Environment

operating temperature	+5°C - +40°C
operating humidity	20% - 80%
atmospheric pressure	80kPa - 106kPa
ALT	≤2000m

### Transport and Storage Environment

Storage temperature	-10°C - +55°C
Storage humidity	≤93%
atmospheric pressure	50kPa - 106kPa

## 8. Symbols

	General warning		Note
	Caution		keep dry
	Medical device		Refer to instruction manual/booklet
	Authorized representative in the European Community/European Union		Do not dispose of the product into the ordinary municipal waste or garbage system
	Direct current		Indoor use only
	Type B applied part		Fragile, handle with care
	Thermodisinfected		This way up
	Sterilizable in a steam sterilizer (autoclave) at the 134°C		Catalogue number
	Date of manufacture		Manufacturer

	Keep away from sunlight		Protect from heat and radio-active sources
	Class II equipment		CE Marking
	Batch code		Serial number

## 9. Technical Specifications

Motor Handpiece	
Speed	100-2500 r/min
Torque	0.6-5.0 Ncm
Measurement accuracy	± 0.5mm
Operation mode	Duty cycle: Max.T_ON: 5min, Min.T_OFF:1min
Degree of Protection against Electric Shock	Type B applied part
Battery	Lithium ion battery (DC 3.7V 1200mAh)
Input power	20VA
Degree of Protection (IEC 60529)	IPX0
Applied Part	Contra angle, File Clip, Lip Hook
Overvoltage category	Class II
Pollution degree	Degree 2
AC adapter	
Input	100-240V ~ 50/60Hz
Classification of Protection against Electric Shock	Class II (AC adapter)
Output	5V  2A
Contra Angle	
Speed ratio	6:1
Material	Aluminum and stainless steel
File Clip, Lip Hook, Touch probe	
Material	File Clip: plastic PI with stainless steel; Lip hook: stainless steel Stainless steel and silicone

## 10. Troubleshooting

If you find that the instrument is not operating normally during use, Please refer to the following methods for instrument maintenance.

Problem	Cause	Solution
Cannot turn on the power	The battery is low	Please charge in time
	Battery failure	Replace the battery
Cannot charge the battery	The AC adapter is not reliably connected	Check that the AC adapter connection is reliable
	Battery failure	Replacement battery
The battery is running out quickly	The charging time for the battery is too short	Charging time for more than 5 hours
	Battery aging	Replacement battery
Apex locator imprecise / not sensitive	Measuring wire connection unreliable	Reconnect the measuring wire or you can contact the file clip to lip hook directly to check the connection status
	The measuring wire has an open circuit or a short circuit	Replace measuring wire
	The root canal is in poor condition	Refer to chapter 4.3.2
Cannot start the motor/ motor does not work	Low voltage protection	Please charge in time
	Contra angle stuck	Clean or replace the contra angle
When the motor is running, the torque value is high	Contra angle wear, resistance becomes larger	Enter the System Setting and run the calibration procedure. If the calibration fails, replace the contra angle

※ Endo Motors should only be serviced by specialized technicians.

## 11. Disposal of Medical device

The instrument and its packaging are designed to be as environmentally friendly as possible.



Follow your local and country-specific laws, directives, standards and guidelines for disposal.

- > Medical device
- > Waste electrical equipment
- > Packaging

## 12. Guarantee

The product and technical service is responsible by Foshan COXO Medical Instrument Co., Ltd. and the technical department will provide technical support for you when there are technical problems.

The motor handpiece and charging base (contra angle and battery are not included) guaranteed for 24 months from the date of purchase.

The contra angle is guaranteed for 12 months from the date of purchase.

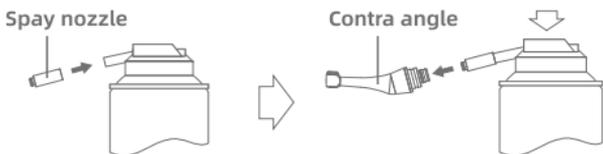
The accessories are guaranteed for 6 months from the date of purchase.

The guarantee is valid for normal usage conditions. Any modification or accidental damage will render the guarantee void.

The supplier can provide, upon request, circuit diagrams, component lists, notes, calibration specifications, or other information necessary to assist the user's qualified technicians in the repair of parts of the instrument which are designated as repairable by the manufacturer.

## 13. Lubrication

- 1) Remove the contra angle from motor handpiece;
- 2) Remove the file from the contra angle;
- 3) Mount the tip nozzle into the spray can port and align the nozzle to the contra angle, Spray lubricating oil into contra angle until clean liquid flows out.



### Caution

- When the head overflows with clean liquid, the entire cleaning and maintenance steps should be repeated.
- It is recommended to inject lubricating oil before sterilization.
- Suggest using BENDECHK brand dentistry handset clean lubricant.

## 14. EMR (Electric Measurement of Root canal length)

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

### 1) 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.

### 2) 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 thoroughly to get rid of all blood, and then make a measurement.

### 3) Root canal with a chemical solution overflowing from the opening

An accurate measurement cannot be obtained if some chemical solution is overflowing from the canal opening. In this case, clean the canal and its opening. It is important to get rid of any solution overflowing the opening.

### 4) 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 this case, build up the tooth with a suitable material to insulate the gingival tissue.

### 5) Fractured tooth

Fractured tooth will cause electrical leakage and an accurate measurement cannot be obtained.

### 6) Leakage through a branch canal

A branch canal will also cause electrical leakage.

### 7) Re-treatment of a root filled with gutta-percha

The gutta-percha must be completely removed 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.

### **8) 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.

### **9) Cutting debris on tooth**

Thoroughly remove all cutting debris on the tooth.

### **10) Pulp inside canal**

Thoroughly remove all the pulp inside the canal. Otherwise an accurate measurement cannot be obtained.

### **11) 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.

### **12) Blocked canal**

The meter will not move if the canal is blocked.

Open the canal all the way to the apical constriction to measure it.

### **13) 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 oxydol or saline.

## **15. Guidance and manufacturer's declaration--EMC**

This product needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided, and this instrument can be affected by portable and mobile RF communications instrument.



## Caution

- Do not use a mobile phone or other instruments that emit electromagnetic fields, near the instrument. This may result in incorrect operation of the instrument;
- This instrument has been thoroughly tested and inspected to assure proper performance and operation!
- This instrument should not be used adjacent to or stacked with other instrument and that if adjacent or stacked use is necessary, this instrument should be observed to verify normal operation in the configuration in which it will be used;
- Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation;
- This equipment is not use with hf surgical equipment.

Serial number	Name	Cable Length (m)	Shielded wire	Remarks
1	AC adapter cable	1.5	No	

### Guidance and manufacturer's declaration - electromagnetic emissions

The model C-Smart Mini AP+ is intended for use in the electromagnetic environment specified below. The customer or the user of the model C-Smart Mini AP+ should assure that they are used in such an environment.

Emission test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The model C-Smart Mini AP+ uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.  The model C-Smart Mini AP+ is suitable for use in all establishments other than domestic and those directly connected to the public lowvoltage power supply network that supplies buildings used for domestic purposes.
RF emission CISPR 11	Class B	
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

**Guidance & Declaration - electromagnetic immunity**

The model C-Smart Mini AP+ is intended for use in the electromagnetic environment specified below. The customer or the user the model C-Smart Mini AP+ should assure that they are used in such an environment.

<b>Immunity test</b>	<b>IEC 60601 test level</b>	<b>Compliance level</b>	<b>Electromagnetic environment - guidance</b>
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air	Floor should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2kV for power supply lines ±1 kV for Input/output lines	±2kV for power supply lines ±1 kV for Input/output lines	Mains power quality should be that of atypical commercial or hospital environment.
Surge IEC 61000-4-5	±0.5 kV, ±1 kV line to line ±0.5 kV, ±1 kV, ±2 kV line to ground	±0.5 kV, ±1 kV line to line	Mains power quality should be that of atypical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % $U_T$ (>95% dip in $U_T$ ) for 0.5 cycle <5 % $U_T$ (>95% dip in $U_T$ ) for 1 cycle 70% $U_T$ (30% dip in $U_T$ ) for 25/30 cycles <5% $U_T$ (>95 % dip in $U_T$ ) for 5/6 sec	<5 % $U_T$ (>95% dip in $U_T$ ) for 0.5 cycle <5 % $U_T$ (>95% dip in $U_T$ ) for 1 cycle 70% $U_T$ (30% dip in $U_T$ ) for 25/30 cycles <5% $U_T$ (>95 % dip in $U_T$ ) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the model C-Smart-Mini AP+ requires continued operation during power mains interruptions, it is recommended that the model C-Smart-Mini AP+ be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

**NOTE:**  $U_T$  is the a.c mains voltage prior to application of the test level.

### Guidance & Declaration - electromagnetic immunity

The model C-Smart-Mini Ap+ is intended for use in the electromagnetic environment specified below. The customer or the user of the model C-Smart-Mini Ap+ should assure that they are used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz  6 Vrms in ISM and amateur radio bands	3 Vrms 150 kHz to 80 MHz  6 Vrms in ISM and amateur radio bands	Portable and mobile RF communications instrument should be used no closer to any part of the model C-Smart-Mini Ap+, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2.7 Ghz  385MHz - 5785MHz Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communication equipment (Refer to table 9 of IEC60601-1-2:2014 +A1:2020)	10 V/m 80 MHz to 2.7 Ghz  385MHz - 5785MHz Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communication equipment (Refer to table 9 of IEC60601-1-2:2014 +A1:2020)	<b>Recommended separation distance</b>  $d = [3,5/V_1] \times \sqrt{P}$  Minimum separation distances for higher IMMUNITY TEST LEVELS shall be calculated using the following equation:  $E = [6/d] \times \sqrt{P}$  Where P is the maximum power in W, d is the minimum separation distance in m, and E is the IMMUNITY TEST LEVEL in V/m.

徐宝悦 · 20250103

王明华 20250103

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