COXO®

USER MANUAL / Endo Motors

CE 0197

C-SMART-I PILOT ADVANCED

Contents

1. Safety

Note:

Failure to follow this instruction may result in device damage.

Warning:

Failure to follow this warning may cause injury to the patient.

Safety Warning: Please read the safety warnings carefully before using this device.

1) The device must be used within the scope mentioned in the manual. The manufacturer accepts no liability for damage resulting from improper use.
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) Only use original components and accessories provided or approved by the manufacturer.
4) To avoid electric shock, do not insert other objects into the device.
5) When cleaning the device, ensure that no cleaning agents enter the internal components, to prevent short circuits and malfunctions.
6) The 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 mucous.
7) If the device 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 values are too low,verify whether the root canal is excessively dry, and confirm findings with an X-ray if necessary.
9) Inspect the device before each use to ensure there are no abnormalities.
10) If the device malfunctions due to improper use or physical damage, stop using it immediately and power it off.
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 device has electromagnetic interference, do not use it around patients with cardiac pacemakers. Do not use around electronic surgery.

13) Unstable voltages and electromagnetic fields may interfere with normal device operation.

14) For disposal of the batteries and other accessories of this device, please observe local ordinances.

15) Incorrect replacement of lithium batteries causes unacceptable risks, and untrained personnel causes hazards (source) (such as over temperature, fire or explosion). Users should not replace the battery without authorization.

16) The AC adapter plug is a segmented device for grid power supply, and should not be placed in places where it is difficult to disconnect the device.

17) The device surface may exceed 41°C during operation. It is recommended to work for 5min and stop for 1min.

18) Service life:
Motor Handpiece: 10 years
Contra-angle: 5 years
Measuring Wire: 15, 000 uses
File Clip and Lip Hook: 250 uses of Sterilization

19) The manufacturing date is indicated on the label.

20) Do not make any modifications to the device.

2. Intended Use

1) The Endo Motor is an endodontic treatment motorized handpiece with root canal measurement capability. It is intended to enlarge the canals while monitoring the position of the file inside the canal.

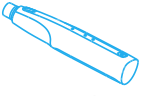
2) The device must be used exclusively in hospitals, clinics, or dental offices by qualified dental professionals.

3) This device is applicable to pediatric, adult, and geriatric patients requiring dental surgical procedures. However, motor parameter settings must be appropriately adjusted according to the oral physiological characteristics and clinical conditions of patients in different age groups.

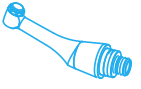
3. Contraindication

1) Patients with implanted pacemakers or other electronic devices who have been advised to avoid small electrical appliances (e.g. electric shavers, hair dryers) should not use this device.
2) Patients with heart disease, pregnant women, and children should use with caution.
3) This device cannot be used for the preparation of severely bent root canals.
4) Do not use this device for dental implantation or other dental surgeries except for pulp.

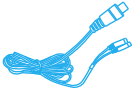
4. Components and Accessories


Motor Handpiece


Main Unit


Contra-angle

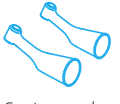

File Clip


Measuring Wire


Tester


Lip Hook


AC Adapter


Contra-angle
Silicone Cover


Wrench

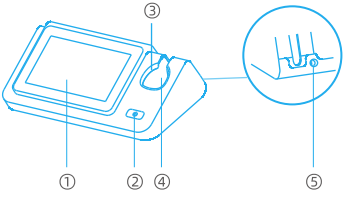

Spray Nozzle

Warning:

· For quantities of each component, please refer to the packing list.

· If the battery, adapter, or contra-angle is damaged, use only original parts from the manufacturer or authorized dealers and follow the manual for replacement.

Main Unit



① Touchscreen

② Main Unit Power Switch

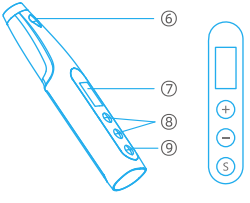
③ Handpiece Charging Indicator-Refer to section "13.2"

④ Handpiece Charging Base

⑤ Adapter Socket-Refer to section "13.2"

Motor Handpiece

Front

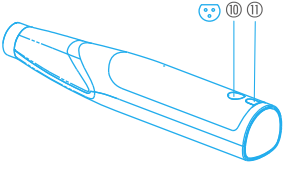


+ Adjust Button

− Adjust Button

S Setting Button

Rear



⑥ ON/OFF Button: Long press to power on/off; Press to start/stop the motor.

⑦ Display Screen

⑧ Adjust Button "+/-"

⑨ Setting Button "S"

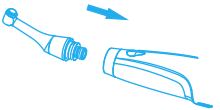
⑩ Measurement Cable Port: Connects to the measuring wire and tester.

⑪ Silicone Plug

5. Installation

5.1. Connecting the Contra-angle

1) Align the contra-angle with the motor handpiece and insert it horizontally until a "click" sound confirms secure attachment.
2) The contra-angle can rotate 360° freely.



Warning:

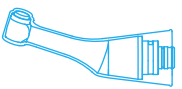
· Before each use, inspect the motor handpiece and contra-angle for damage.

· Handle the contra-angle carefully to prevent damage from drops or impact.

· Do not connect or disconnect the contra-angle while the motor is running.

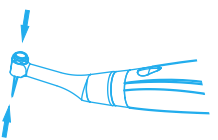
5.2. Attaching the Contra-angle Silicone Cover

1) Hold the lower part of the contra-angle.
2) Slide the contra-angle silicone cover upward from the bottom until it fully cover the working area of the contra-angle.
3) Ensure that the contra-angle silicone cover fits snugly against the contra-angle with no looseness.



5.3. Connecting the File

1) Hold down the push button on the contra-angle.
2) Insert the file and rotate it slightly until it aligns with the latch groove and slips into place. Release the button to lock the file securely.



Warning:

· The rod of the file must comply with the requirements of Type 1 rod in ISO 1797.

· Select a suitable file according to root canal preparation needs.
Use files step-by-step, from small to large, preferably of the same type.

· Files are consumable. Replace worn-out files promptly to prevent breakage.

· Do not use bent, twisted or otherwise damaged files.

· Turn off the device before inserting or removing files.

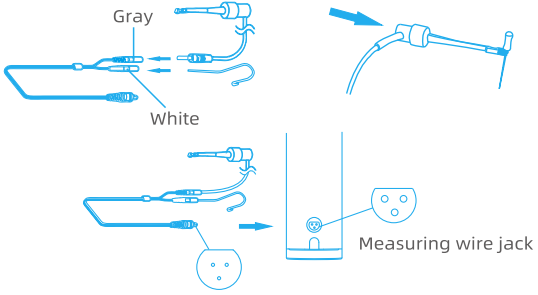
· Press the push button during file insertion/removal to avoid damage to the chuck mechanism and the file.

5.4. Connecting the Measuring Wire

1) Connect the lip hook to the white jack on the measuring wire,and the file clip to the gray jack on the measuring wire.

2) Press the push button on the file clip to insert the file, then release to lock.

3) Connect the measuring wire plug to the socket on the back of the handpiece. Ensure it is fully inserted for stable operation.



Warning:

· Do not bang or bump the plugs when they are inserted.

· Do not use damaged or deformed file.

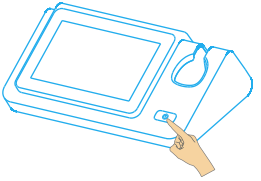
· Do not wrap the measuring wire around the device.

· The file clip is required only in Apex Locator Mode . It is not needed in Multi-Function Mode.

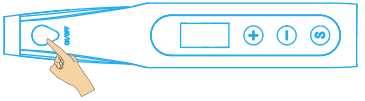
6. Usage

6.1. Power On/Off

Main Unit Power On/Off:
Long press the main power switch for 3 seconds to turn the screen on or off.



Handpiece Power On/Off:
Long press the ON/OFF button on the handpiece for 3 seconds to turn the screen on or off.



6.2. Connect to Bluetooth

Bluetooth will automatically connect after main unit and handpiece are turned on. The bluetooth connection status is displayed on the status bar of the main unit and on the handpiece screen:

Blue: Connected Gray: Not Connected Red: Connection Error

Note:

- In case of a bluetooth connection failure requiring re-pairing or handpiece replacement, refer to "13.1 Bluetooth Re-pairing".
- If a bluetooth connection failure occurs, the device supports operation in standalone handpiece mode, refer to "11. Standalone Handpiece Operation".

6.3. Switching User and Mode

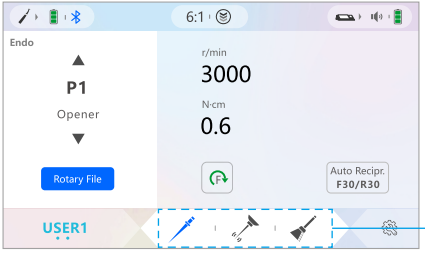
6.3.1. Switching User

1) Press the button USER1 on the main unit interface to cycle through four user profiles.

2) Each user can store individual settings (program remark name, program parameters).

6.3.2. Switching Modes

Press the mode button to select an operating mode; the active mode is highlighted in blue.



The following operating modes are available:

1) Endo Mode

Includes 3 sub-modes, each supporting up to 9 custom programs (P1–P9):

· Motor-Only Mode: This is the default mode at system startup.

· Apex Locator Mode: Automatically activated when the measurement wire is connected.

· Multi-Function Mode: Press the mode switch button (located on the right side of the apex locator interface) to enter.

2) Four Specialized Modes

Each mode supports up to 3 custom programs.

Endo Activate Mode

Orthodontic Mode

Tooth Polish Mode

Torque Wrench Mode

Note:

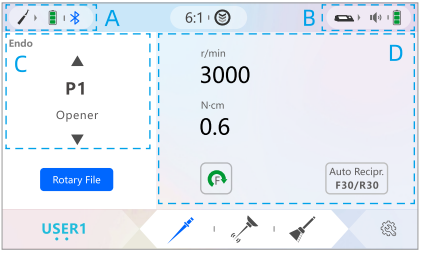
The main unit interface displays 3 modes by default. For details on mode configuration, refer to Section 12.1.

7. Motor-Only Mode

Press the button on the main unit to enter Motor-Only Mode.

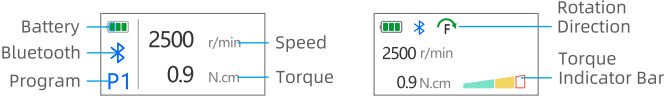
7.1. Interface Description

Main Unit Interface



A	Handpiece Status Bar	Displays handpiece battery level and bluetooth connection status: Gray-Not connected / Blue-Connected / Red-Connection error Battery Level Charging
B	Main Unit Status Bar	Displays main unit key tone status and battery level: On / Off The main unit's battery icon is the same as above.
C	Program Selection Area	Shows the current program number **P1** and remark name Opener . Remark names can be modified in user settings.
D	Operation Area	Allows setting of speed, torque, motor rotation direction, and torque reached action.

Handpiece Interface

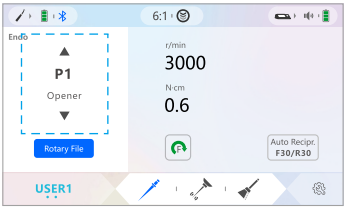


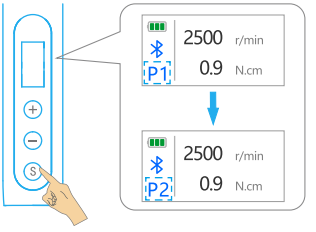
Motor-Only Mode (Standby) Motor-Only Mode (Working)

7.2. Switch Program

Main Unit: Press the program button ▲ ▼ to switch programs.

Handpiece: Press the "S" button to cycle through programs. The screen displays the current program number.





7.3. Select File

Press the " Rotary File / Reciprocating " button on the main unit screen to switch the file type.

· Rotary file: Operates in continuous rotation (clockwise or counterclockwise); speed and torque are adjustable.

· Reciprocating file: Alternates between clockwise and counterclockwise directions, generating a reciprocating motion; speed, angle, and torque are adjustable.

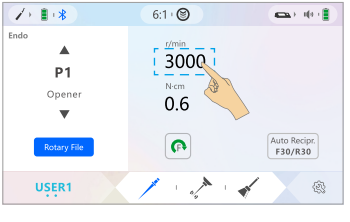
7.4. Setting Speed,Torque,and Reciprocating Angle

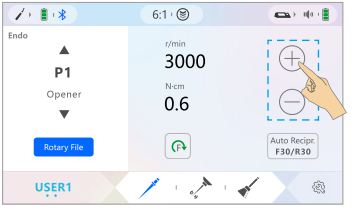
Main Unit:

1) Press the value; it will flash to enter edit mode.

2) Press the "+/-" buttons to increase or decrease the selected parameter.

3) Press any blank area on the screen to save and exit.





Handpiece:

Press the "+/-" buttons on the handpiece to adjust the speed.

Note:

- If the handpiece is disconnected from the main unit via bluetooth, certain parameters can still be adjusted using the handpiece buttons, refer to chapter 11 for details.
- Under bluetooth connection, the handpiece only supports speed adjustment; other parameters must be adjusted through the main unit, and the handpiece will automatically synchronize the parameters.

7.5. Adjust Rotation Direction

Press the rotation direction button on the main unit interface to change the motor's rotation direction.

Forward / Reverse

Note:

When in reverse, a "beep-beep" sound is emitted. After the motor stops, the rotation direction automatically returns to forward.

7.6. Setting Torque Reached Action

During operation, when the torque reaches the preset limit, the motor will automatically execute the selected protective action-Auto Stop, Auto Reverse, or Auto Reciprocate.

1) Auto Stop:

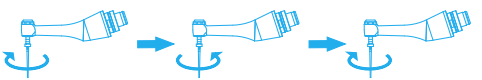
The motor stops immediately and enters standby mode.

2) Auto Reverse:

The motor reverses its rotation.

If the torque falls below the preset limit, or if the file retracts from the apex, the motor resumes forward rotation.

During reverse rotation, if the torque exceeds the overload threshold, the motor stops and enters standby mode.



3) Auto Reciprocate:

The motor performs reciprocating motion at the selected angle (30°, 60°, or 90°).

If the torque decreases below the preset value or the file moves away from the apex, the motor resumes forward rotation.

If the torque exceeds the overload threshold during reciprocation, the motor stops and enters standby mode.

These functions enhance safety and efficiency during root canal treatment by preventing file separation and over-instrumentation.

> ⚠ **Warning:**
> Avoid applying excessive force to the root canal enlargement file during motor operation, as this may lead to file deformation or breakage.

7.7. Operation Status

7.7.1. Start/Stop Operation

Press the ON/OFF button on the handpiece. The motor will rotate at the speed set by the system.

Press the ON/OFF button again to stop the motor.

7.7.2. Main Unit Operation Status Display

1) Rotation Direction

Forward(Clockwise)


Reverse(Counterclockwise)

Reciprocating

2) Torque Bar

When the load reaches 50% of the preset torque, the torque bar displays  .

When the load approaches the preset torque limit, the torque bar displays  .

7.7.3. Handpiece Operation Status Display

1) Rotation Direction

Forward(Clockwise)


Reverse(Counterclockwise)

Reciprocating

2) Torque Bar

When the load reaches 50% of the preset torque, the torque bar displays  .

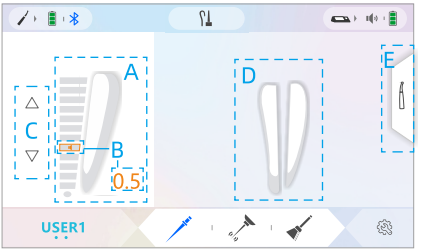
When the load approaches the preset torque limit, the torque bar displays  .

8. Apex Locator Mode

Upon connecting the attachments as specified in Section "5.4", the device will automatically enter Apex Locator Mode .

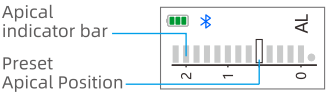
8.1. Interface Description

Main Unit Interface

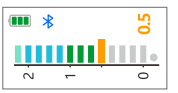


A	Root Apex Area	Displays the real-time position relationship between the file tip and the apical foramen.
B	Preset Apical Position	The number indicates the relative distance between the file tip and the apical foramen-the smaller the number, the closer to the apex.
C	Adjustment Button	Press the button △ ▽ to customize the preset apical position.
D	Complete Root Canal Image	The enlarged apex area clearly shows the relative position of the file as it continues downward from the canal orifice.
E	Apex Locator/ Multi-Function Mode Switch	Press to switch between Apex Locator Mode and Multi-Function Mode.

Handpiece Interface



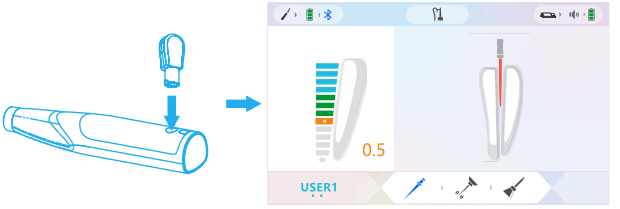
Apex Locator Mode (Standby)



Apex Locator Mode (Working)

8.2. Connection Testing

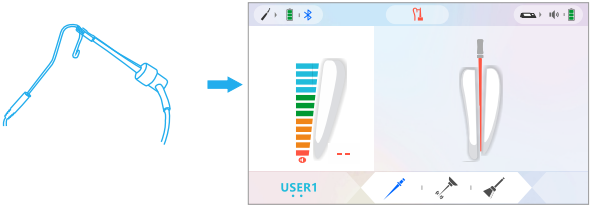
1) Checking with Tester：Connect the tester to the measuring wire jack on the back of the handpiece. Check that indicator bars light up between 0.0-0.5.



Warning：

If the indicator bars do not light up between 0.0-0.5, stop using the device immediately and repaired it.

2) Connection Testing：Touch the lip hook with the clip on the end of the file clip and check that all the indicator bars light up，as shown below:



Warning：

Check the device'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 device immediately and have it repaired.

8.3. Customizing the Preset Apical Position

Main Unit: Press the " △ / ▽ " button on the screen to set a custom apex reference position.

When the file tip approaches or reaches the preset reference point, the system automatically issues different audible alerts and activates corresponding motor functions (available in Multi-Function Mode).

Note:

Under bluetooth connection, the custom apex position cannot be adjusted from the handpiece; it must be set on the main unit.

8.4. Measurement

1) Place the lip hook securely on the patient's lip, opposite to the tooth being measured.

2) The numbers do not represent an absolute length. It simply indicates the relative file position towards the apical foramen. These numbers are used to help determine the working length.

- Blue Zone:There is slow beeping sound when the file reaches 1.0-2.0.
- Green Zone:The beeping sound Interval become frequently when the file reaches 0.5-1.0.
- Orange Zone:There is fast beeping sound when the file reaches 0.0-0.5.
- Red Zone:Sustained beep sounds when the file reaches or exceeds the preset apical position.

3) During the measurement process, the apex indicator bar displayed on the handpiece is synchronized with the main unit.

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.
- When a file enters the root canal and the screen never shows the position of the file, the device may be malfunctioning.

9. Multi-Function Mode

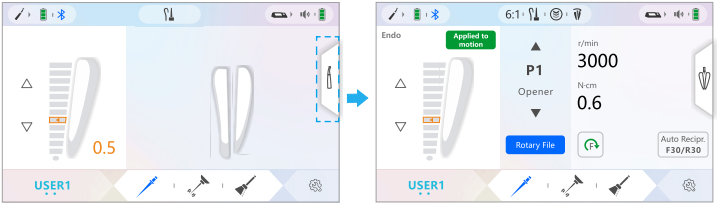
Connect the contra-angle and file, refer to section "5.1""5.3".

Connect the measuring wire and handpiece, refer to section "5.4".

Check the apex locator connection, refer to section "8.2".

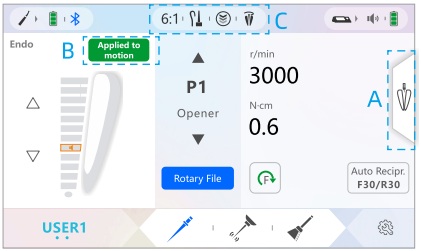
In Apex Locator Mode, Press the Apex/Multi-Function switch icon or press the ON/OFF button on the handpiece to enter Multi-Function Mode.

Program selection, file type selection, and parameter adjustment in Multi-Function Mode follow the same procedure as in Motor-Only Mode, refer to sections "7.2-7.5".



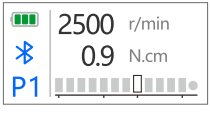
9.1. Interface Description

Main Unit Interface

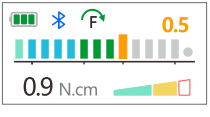


A	Apex Locator / Multi-Function Mode Switch	Press to switch between Apex Locator Mode and Multi-Function Mode.
B	Apex Control Motor Button	Apex locator controlled motor operation. **Applied to motion** When apex-motor linkage is enabled, the apex measurement controls motor actions. **Not applied to motion** When linkage is disabled, apex measurement is for display only and does not affect motor operation.
C	Status Bar	Displays current gear ratio of the selected mode 6:1 . Measurement circuit status (Circuit Not Connected/ Short Circuit) Auto slowdown status (ON / OFF) Auto start/stop status (ON / OFF)

Handpiece Interface



Multi-Function Mode(Standby)



Multi-Function Mode(Working)

9.2. Setting Torque Reached and Apical Action

During operation, the motor will automatically perform the selected protective action-Auto Stop, Auto Reverse, or Auto Reciprocate-when either of the following conditions is met:

· The torque reaches the preset limit.

· The file reaches the preset apical position .

Protection Action:

Auto Stop:

When the torque reaches the preset value or the file reaches the preset apical position, the motor will automatically stop and return to standby mode.

Auto Reverse:

When the torque reaches the preset value or the file reaches the preset apical position, the motor will automatically reverse rotation.

If the torque decreases below of the preset value or the file moves away from the apex, the motor resumes forward rotation.

If the torque exceeds the overload threshold during reverse rotation, the motor stops and enters standby mode.

Auto Reciprocate:

When the torque reaches the preset value or the file reaches the preset apical position, the motor performs reciprocating motion at the selected angle (30°, 60°, or 90°).

If the torque decreases below of the preset value or the file moves away from the apex, the motor resumes forward rotation.

If the torque exceeds the overload threshold during reciprocation, the motor stops and enters standby mode.

Note:

· In reciprocating and reverse motion, the torque reached or apical action is disabled.

· In Multi-Function Mode, apical actions are synchronized with torque reached settings. For example, if the reached torque action is set to Auto-Reverse, then the apical action upon reaching the apex will also be Auto-Reverse.

9.3. Enable/Disable Apex-Controlled Motor

Users can enable or disable the following apex locator linkage control functions collectively by tapping the Applied to motion / Not applied to motion button on the main unit interface, according to clinical needs.

Setting torque reached and apical action, refer to section "9.2".

Endo auto start in Endo Mode, refer to section "12.3".

Auto slowdown in Endo Mode, refer to section "12.3".

9.4. Operation Status

Refer to section "7.7".

10. Specialized Mode

10.1. Endo Activate Mode

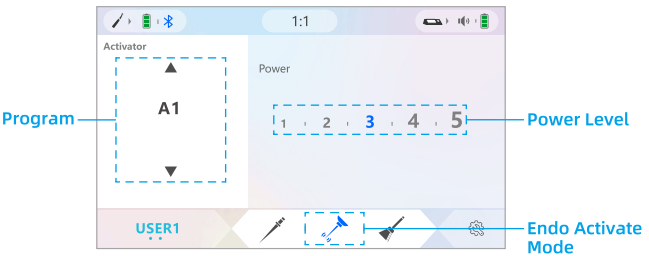
Endo activate mode enhances the flow and effectiveness of irrigants inside the root canal, helping to remove debris, eliminate the smear layer, and improve disinfection in curved or complex canal systems.

10.1.1. Installation and Connection

Connect the contra-angle (C1-EA1,1:1) and the dental irrigation needle. For details, refer to the contra-angle operation manual.

10.1.2. Interface Description

Main Unit Interface



Handpiece Interface

Endo Activate Mode (Standby)

10.1.3. Operating Procedure

1) Program Selection - Main Unit: Press the program ▲ ▼ area to select a program.
2) Program Selection - Handpiece: Press the "S" button to cycle through programs. The screen displays the current program number.
3) Power Adjustment - Main Unit: Press the speed value on the screen to switch gears.
4) Power Adjustment - Handpiece: Press the adjustment keys (+/-) to change gears; long press for quick adjustment.

10.2. Tooth Polish Mode

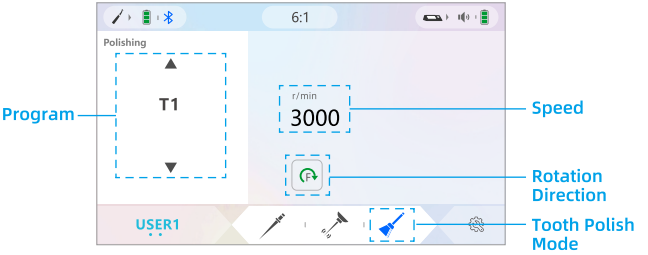
Tooth polish mode provides low-speed, controlled rotation to assist in the finishing and polishing of the tooth surface, enhancing the smoothness.

10.2.1. Installation and Connection

Connect the contra-angle (C5-5M, 6:1) and polishing cup, refer to section "5.3".

10.2.2. Interface Description

Main Unit Interface



Handpiece Interface

Tooth Polish Mode (Standby)

10.2.3. Operating Procedure

1) Program Selection - Main Unit: Press the program ▲ ▼ area to select a program.
2) Program Selection - Handpiece: Press the "S" button to cycle through programs. The screen displays the current program number.

3) Speed Adjustment – Main Unit:

- Press the speed value; the value will flash, entering edit mode.
- Press the "+/-" buttons to increase or decrease theameter.
- Press any blank area on the screen to save and exit.

4) Speed Adjustment – Handpiece: Press the "+/-" buttons on the handpiece to adjust the speed.

10.3. Orthodontic Mode

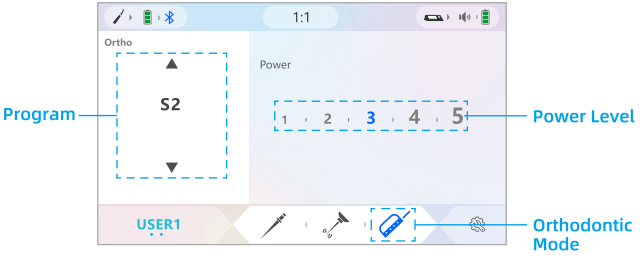
This product is used during the inter proximal reduction procedure in dental orthodontic treatment. Precise enamel reduction is essential for correcting bite, relieving crowding, and improving orthodontic results.

10.3.1. Installation and Connection

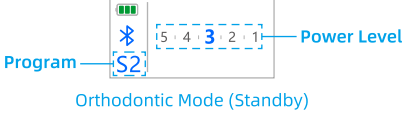
Connect the contra-angle (C-iR1, 1:1) and orthodontic saw blades. Refer to the contra-angle operation manual.

10.3.2. Interface Description

Main Unit Interface



Handpiece Interface



10.3.3. Operating Procedure

For program selection and power adjustment, refer to section "10.1.3".

10.4. Torque Wrench Mode

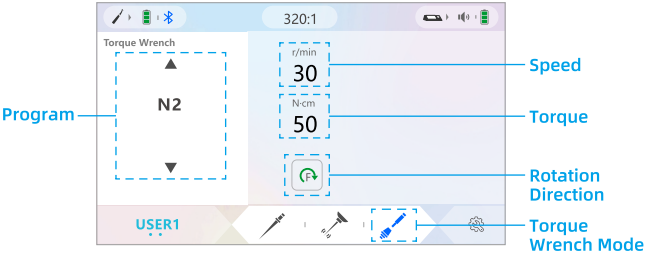
This product is used for the placement and removal of abutments during dental implant procedures. Replaces traditional manual implant wrenches, allowing precise torque control during implant placement.

10.4.1. Installation and Connection

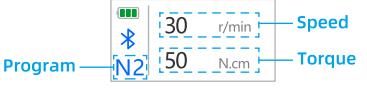
Connect the contra-angle (C-TW3, 320:1) and screwdriver . Refer to the contra-angle operation manual.

10.4.2. Interface Description

Main Unit Interface



Handpiece Interface



Torque Wrench Mode (Standby)

10.4.3. Operating Procedure

For program selection , speed and torque adjustment, refer to section "10.2.3".

> **Note:**
> In torque wrench Mode, torque can only be adjusted via the main unit interface.

11. Standalone Handpiece Operation

When bluetooth connection is lost,the handpiece supports the following standalong functions.

Note:

· After reconnection, the handpiece syncs with the main unit settings.

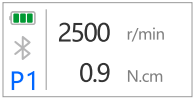
· When used alone, the handpiece supports only Endo Mode.

11.1. Select Mode

When bluetooth is disconnected, the following modes are available:

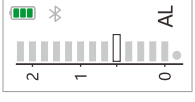
1) Motor-Only Mode:

After bluetooth disconnection, the handpiece enters the Motor-Only Mode interface.



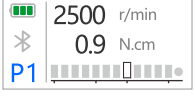
2) Apex Locator Mode:

If the measuring wire is connected, the handpiece enters the Apex Locator Mode interface. Press the "+/-" button to adjust the custom apex position.



3) Multi-Function Mode:

If the measuring wire is connected, Press the ON/OFF button to enter the Multi-Function Mode interface.



11.2. Select Programs

Press "S" button to cycle through.

P1 → P2 → ... → P9 → Apex Locator Mode (requires measurement wire).

11.3. Adjust Parameters

1) Enter Adjustment Mode: Long press the "S" button to enter the adjustment mode for the current program.

Adjustment interface

2) Switch Options: Press the "S" button to cycle through file type, speed, and torque/angle.

3) Modify Values:
   Press the "+/-" buttons for stepwise adjustment;
   Long press the "+/-" buttons for rapid continuous adjustment.

4) Save and Exit: Press the ON/OFF button to return to standby mode.

> **Note:**
>
> Program P9 is fixed for continuous reverse rotation, and only speed can be adjusted.

11.4. Operation Status

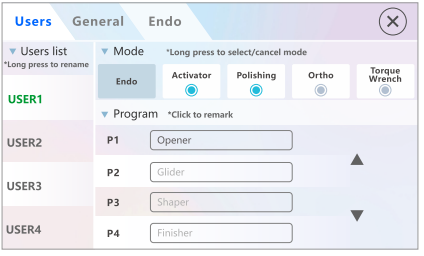
Refer to section "7.7.3 Handpiece Operation Status Display".

12. Setting

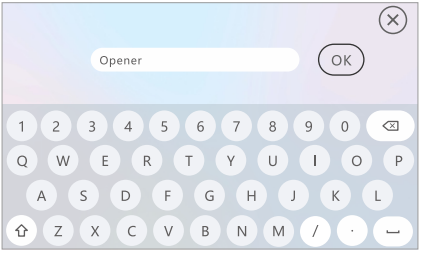
Press the settings button on the main interface to enter the settings menu.

12.1. Remark Name

User Settings Interface



Keyboard Input Interface



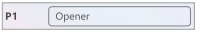
In the user settings interface, the following operations can be performed:

1) Edit User Remark Name

Long press the user remark name  below the user list to enter the keyboard page for remark name input.

2) Edit Program Remark Name

· Press the buttons ▲ ▼ to navigate to the previous/next program page.

· Press the input box  to open the keyboard page and enter the remark name.

Note:

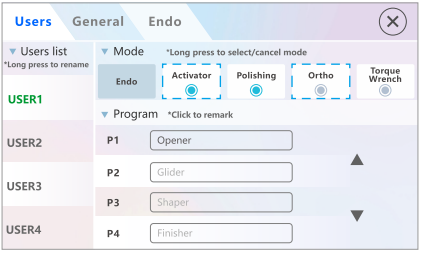
When entering remark name, the keyboard allows a maximum of 12 characters, including letters, numbers, and symbols.

3) Select Mode

Long press the icon to select this mode.

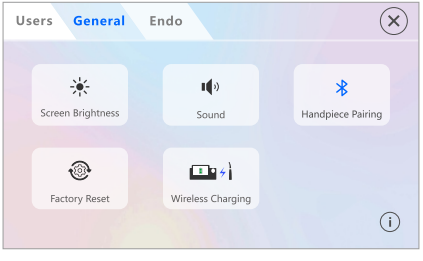
Long press again to deselect this mode.

Up to three modes can be selected simultaneously (the Endo Mode is the default and cannot be deselected).



12.2. General Settings

General Settings Interface



1) Screen Brightness:

Press the button to switch the screen brightness. There are three brightness levels available:Level 1 , Level 2 , Level 3 .

2) Sound

Press the button to turn the main unit sound on or off  .

3) Handpiece Pairing

Refer to section "13.1 Bluetooth Re-Pairing".

4) Factory Reset

· Press the button to restore factory settings.

· Follow the prompts in the pop-up window.

· After the reset is complete, the device will return to the main screen.

> ⚠ **Warning:**
> Restoring factory settings will erase all user data and cannot be undone.

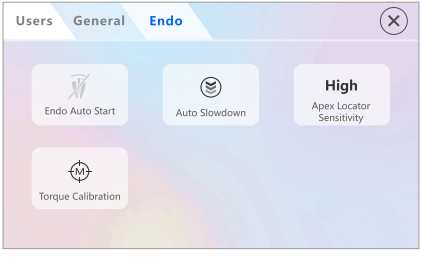
5) Wireless Charging

Press the button to enable or disable the main unit's wireless charging for the handpiece.

> **Note:**
> When the main unit battery is low, its wireless charging function for the handpiece is unavailable.

12.3. Endo Settings

Endo Settings Interface



1) Endo Auto Start

When enabled, the motor automatically starts when the file is inserted into the canal and stops when the file is withdrawn from the canal. The device remains in standby mode before the file is inserted.

2) Auto Slowdown

When the function is enabled, the motor will automatically slow down when the file reaches the "1.0" position in the canal. Once the file exits this position, the motor returns to the preset speed.

Note:

- The auto slowdown is only effective in " Rotary File " programs.
- The endo auto start only when triggered automatically. If the motor is started manually via the on/off button, it will not stop automatically when exiting the canal, even if the function is enabled.
- Manual control takes priority over automatic activation-the motor can always be stopped manually.

3) Apex locator Sensitivity

Three sensitivity levels are available: High, Medium, and Low.

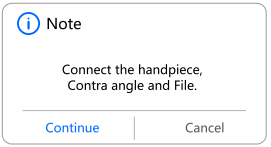
4) Torque Calibration

The calibration function is designed to reduce the discrepancy between the set and actual torque of the motor and contra-angle.

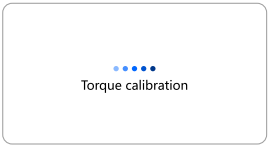
Calibration steps:

- Press the settings button to enter the endo settings interface.
- Press the calibration button and follow the on-screen instructions.
- Once calibration is complete, the motor will stop, and the screen will return to its previous state.

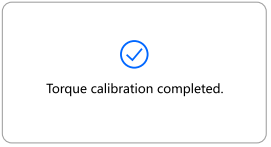
Start:



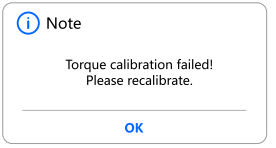
Calibrating:



Complete:



Failed:



Warning:

- Connect the contra-angle before calibration.
- Do not touch the file or apply pressure to the motor, otherwise the calibration will fail.
- The screen displays "completed", indicating that the device is functioning normally.
- If the screen displays "failed":
  1) Check for any obstructions or debris in the contra-angle and clean it thoroughly.
  2) Ensure the battery is sufficiently charged.
  3) Repeat the calibration process.If the problem persists, contact the manufacturer or authorized service center for assistance.

13. Maintenance

13.1. Bluetooth Re-Pairing

This operation is only required when replacing the handpiece or main unit, or if the bluetooth disconnects automatically.

13.1.1. Connecting

1) Go to General Settings and press the bluetooth pairing button. Follow the on-screen instructions.
2) Long press the handpiece "S" button until it enters bluetooth pairing mode.
3) After pairing is completed, the bluetooth icon on the main unit will change as follows:

Not Connected Connected

13.1.2. Disconnecting

When bluetooth is connected,press the "Handpiece Pairing" button and follow the on-screen instructions to disconnect the main unit from the handpiece.

13.2. Charging

13.2.1. Battery Level Display

The main unit/handpiece status bar icons indicate:

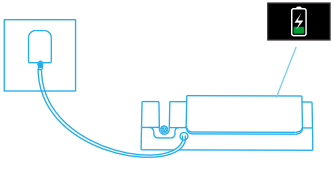
Sufficient Battery (≥60%); Medium Battery (20%-60%); Low Battery (≤20%)

Charging Critical Battery Level.The device will automatically shut down. Please stop operation immediately and recharge.

13.2.2. Charging

1) Main Unit Charging:

· Connect the adapter to the rear port of the main unit. the charging status is shown as follows:



· When main unit charging, the screen displays the charging symbol and status. After 3 minute of inactivity, the symbol will disappear, you can press the ON/OFF button or touch the screen tocheck the charging status.

2) Handpiece Charging:

· Adapter Charging:

Connect the adapter to the main unit's rear port and place the handpiece on the main unit's charging dock to charge.

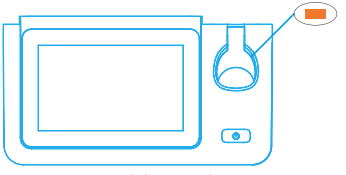
· Internal Wireless Charging:

When the main unit has sufficient battery, it can wirelessly charge the handpiece via its internal battery without connecting the adapter.

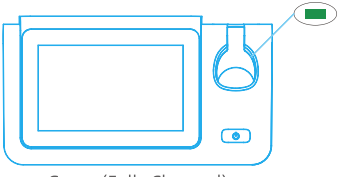
Note:

When the host battery is low, this function is unavailable and the button is displayed in gray  .

The handpiece charging light will illuminate flashing orange, indicating battery is charging and will show constant green when fully charged.



Orange (Charging)



Green (Fully Charged)

Note:

· If over current occurs, charging stops automatically.

· The indicator flashes and "E3" appears on the screen.

· To resume charging, disconnect power or turn off the device first.

Warning:

· Keep the charging environment dry.

· Do not connect measuring wires, testers, or similar accessories while charging.

· Use only the original power adapter to avoid short circuits or device damage.

· Do not charge in humid environments.

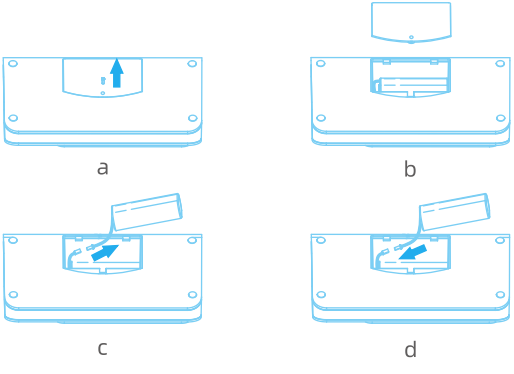
· Charge the handpiece only with the designated main unit.

· After charging, disconnect the power adapter and unplug the connector.

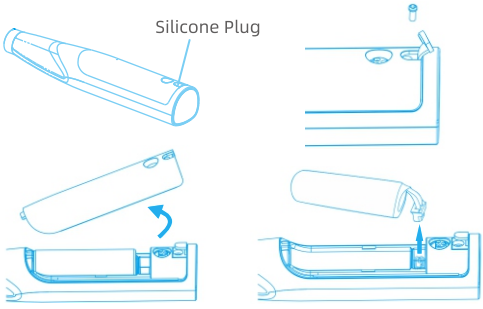
· If not in use for an extended period, charge at least once a month.

13.3. Replacement Battery

1) Open the rubber cover or remove the screw.
2) Remove the battery cover as shown in the illustration.
3) Remove the old battery.
4) Connect the new battery.
5) Install the cover and its screw or rubber cover.



Main Unit



Handpiece

Warning:

· Always use the original designated batteries (Main Unit: JW-Y2S-2.6; Handpiece: LI-ION16500-JW-No24). Use of non-original batteries may damage the device.

· Do not use leaking, deformed, or damaged batteries.

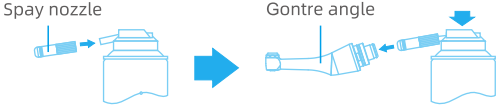
· Do not replace the battery with wet hands, as this may cause a short circuit or allow liquid to enter the device.

13.4. 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.



Warning:

· 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.

14. Cleaning, Disinfection and Sterilization

Device	Contra-angle, File clip, Lip hook, Motor handpiece, Charging Base, Measuring Wire, AC adapter, Contra-angle Silicone Covers. The procedure for cleaning, disinfection and sterilization applies only to the accessories Contra-angle, File clip, Lip hook, Contra-angle Silicone Covers.
ADVICE	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. In case of damage the device should be reprocessed before sending back to the manufacturer for repair.
Reprocessing Instructions	
Preparation at the Point of Use	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 (<40°C) immediately after use. Don't use a fixating detergent or hot water (>40°C) as this can cause the fixation of residuals which may influence the result of the reprocessing process. Store the instruments in a humid surrounding.
Transportation	Safe storage and transportation to the reprocessing area to avoid any damage and contamination to the environment.
Preparation for Decontamination	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. 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!

Decontamination of other parts than Contra -angle, File clip, Lip hook, Contra -angle Silicone Covers	After operation, take out the Motor handpiece and AC adapter on the work bench. 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. 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-Lip hook and CE marking, FDA and Health Canada Approval lighting device: 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.
Pre-Cleaning	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.
Manual Cleaning (For US)	Recommend using 3M mutienzyme cleaning agent at a concentration of 5mL/1L distilled water. • Soak the soft cloth in detergent and wring it out. • Wipe the outer surface of the handpiece with the soft cloth. • Clean the chuck, gaps and threads: brush back and forth with a soft brush under running tap water to remove contaminants. • Rinse handpiece with tap water until all visible contaminants have been removed. • Remove any liquid residue with a lint-free cotton cloth, then dry at 30°C. • Remove any liquid residue with a lint-free cotton cloth, then dry at 30°C. • Checked that if the devices were clean or broken after cleaning. If the cleaning is not good enough, repeat the cleaning procedure. 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.

Automated Cleaning (For EU)	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. Automated Cleaning: Put the instrument into the machine on a tray. Connect the instrument with the WD by using suitable AC adapter and start the program: • 4 min pre-washing with cold water (<40°C) • Emptying • 5 min washing with a mild alkaline cleaner at 55°C • Emptying • 3 min neutralizing with warm water (>40°C) • Emptying • 5 min intermediate rinsing with warm water (>40°C) • Emptying 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.
Automated Disinfection (For EU)	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.
Manual Drying (For US)	Use compressed air to blow dry the internal pipes and external surfaces separately.
Automated Drying (For EU)	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.
Functional Testing, Maintenance	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.

Packaging	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.
Sterilization (For US)	Sterilizable parts: Contra-angle, File clip, Lip hook, Contra-angle Silicone Covers Sterilization method: Gravity-Displacement Steam Cycle Sterilization conditions: 135℃, 10 minutes Drying Time: 30 minutes
Sterilization (For EU)	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
Storage	Storage of sterilized instruments in a dry, clean and dust free environment at modest temperatures refer to label and instructions for use.
Reprocessing validation study information	The above-mentioned reprocessing process (cleaning, disinfection sterilization) has been successfully validated.
Additional Instructions: 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.	

15. Troubleshooting

15.1. Troubleshooting and Solutions

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

Problem	Cause	Solution
Cannot turn on the power	The battery is low	Please charge in time
	Battery failure	Contact the dealer or manufacturer
Cannot charge the battery	The AC adapter is not reliably connected	Check that the AC adapter connection is reliable
	Dirty magnetic connection	Wring out a clean, damp cloth and wipe off the soiled area
	Battery failure	Contact the dealer or manufacturer
The battery is running out quickly	The charging time for the battery is too short	Charging time for more than 5 hours
	Battery aging	Contact the dealer or manufacturer
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
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.

15.1.1. 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.

15.2. Error Codes

Error Type	Possible Cause	Solution
E1-Screen Communication Error	· Main control circuit malfunction · Abnormal connection between the screen and mainboard	Power off and restart the device. If the problem persists, contact your dealer or the manufacturer for service.
E2-Bluetooth Error	· Bluetooth circuit malfunction · Bluetooth communication error	Power off and restart the device. If the problem persists, contact your dealer or the manufacturer for service.

16. Technical Specifications

adapter	Input：AC100V-240V~50/60Hz
	Output：DC10V 1.5A
Input power	30VA
Main Unit Battery	Lithium ion battery (DC7.4V 2600mAh)
Speed（6:1）	100-3000rpm
Torque（6:1）	0.6-5.0Ncm
Protection against electric shock	Type B applied part
Classification of Protection against Electric Shock	Class II (AC adapter)
Degree of Protection (IEC 60529)	IPX0
Operation Mode	Short-time Operation
Applied Part	Contra-angle, File Clip, Lip Hook
Overvoltage category	Class II
Pollution degree	Degree 2

Cybersecurity

Operating Environment	Functions only between the main unit and handpiece; not compatible with other devices.
Security Software	No external network connection; not compatible with third-party software.
Data and Device (System) Interface	Bluetooth 2.4G
User Access Control Mechanism	Main unit and handpiece must be paired ; not open to external access.
Software Environment	No external network connection; not compatible with other software.
Security Software Updates	No external network connection; security software and updates not supported.
Modulation Mode	GFSK
Frequency Range	2400 MHz - 2483.5MHz (2.4G ISM band)
Transmission Power	-23dBm - 0dBm (programmable via software)

17. Operating, Transport and Storage Operating

Operating Environment

Operating temperature	+5°C - +40°C
Operating humidity	20% - 80%
Atmospheric pressure	80kPa - 106kPa

Transport and Storage Environment

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

18. Guarantee

1) 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.
2) The motor handpiece and charging base(contra-angle and battery are not included) guaranteed for 24 months from the date of purchase.
3) The contra-angle is guaranteed for 12 months from the date of purchase.
4) The accessories are guaranteed for 6 months from the date of purchase.
5) The guarantee is valid for normal usage conditions. Any modification or accidental damage will render the guarantee void.
6) 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 device which are designated as repairable by the manufacturer.

19. Disposal of Medical device

The device 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

20. Symbols

	General warning		Note
	Caution		Keep dry
	Serial number		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
	Thermodisinfectable		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		Medical device

21. 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 device can be affected by portable and mobile RF communications device.

Warning:

- Do not use a mobile phone or other devices that emit electromagnetic fields, near the device. This may result in incorrect operation of the device.
- This device has been thoroughly tested and inspected to assure proper performance and operation!
- This device should not be used adjacent to or stacked with other device and that if adjacent or stacked use is necessary, this device 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-I PILOT is intended for use in the electromagnetic environment specified below. The customer or the user of the model C-SMART-I PILOT should assure that it used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR 11	Group 1	The model C-SMART-I PILOT use 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.
RF emission CISPR 11	Class B	The model C-SMART-I PILOT 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.
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-I PILOT is intended for use in the electromagnetic environment specified below. The customer or the user the model C-SMART-I PILOT should assure that they are used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8kV, ±15 kV air	±8 kV contact ±2 kV, ±4 kV, ±8kV, ±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	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 instrument requires continued operation during power mains interruptions, it is recommended that the instrument be powered from a 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-I PILOT is intended for use in the electromagnetic environment specified below. The customer or the user of the model C-SMART-I PILOT should assure that it is 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-I PILOT, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = [\ 3,5/V1\ ] \times P^{1/2}$ Mininum separation distances for higher IMMUNITY TEST LEVELS shall be calculated using the following equation: $E = [\ 6/d\ ] \times P^{1/2}$ 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.
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 communicati on equipmen (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 communicati on equipmen (Refer to table 9 of IEC60601-1-2: 2014+A1:2020)	

COXO®

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AE0933
Ver：1.0
Revision Date：2025.07.10