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COXO®



User Manual

C-Smart-mini

NOVA X

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Endo Motors

CE 0197

Guidance & Declaration – electromagnetic immunity			
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device 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 device, 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 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)	**Recommended separation distance** $d = [\ 3{,}5/V_1\ ] \times P^{1/2}$ 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.

Thank you for purchasing the device.

For optimum safety and performance, please read this manual thoroughly before using the device, paying close attention to all warnings and notes.

Keep this manual in a convenient location for quick and easy reference.

The manufacturer reserves the right to update or modify this manual and the related product without prior notice.

Fig.1 Components and accessories

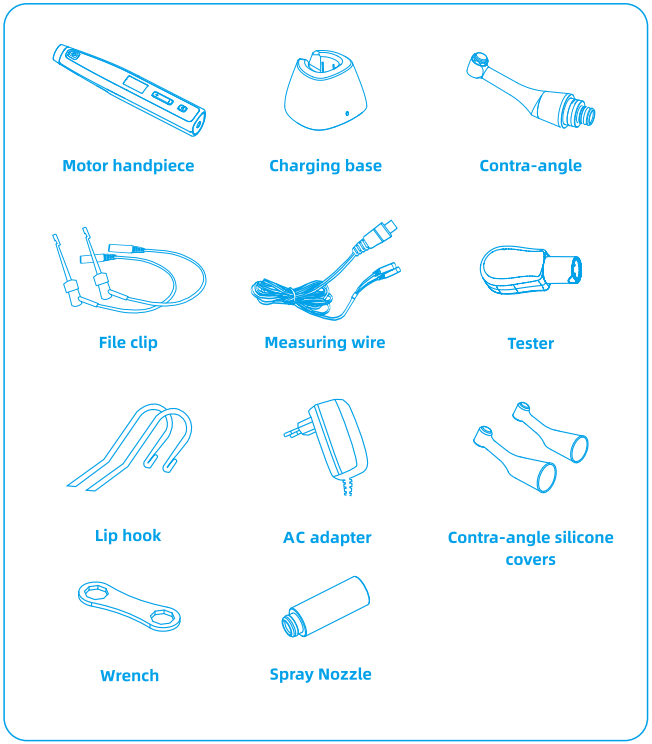
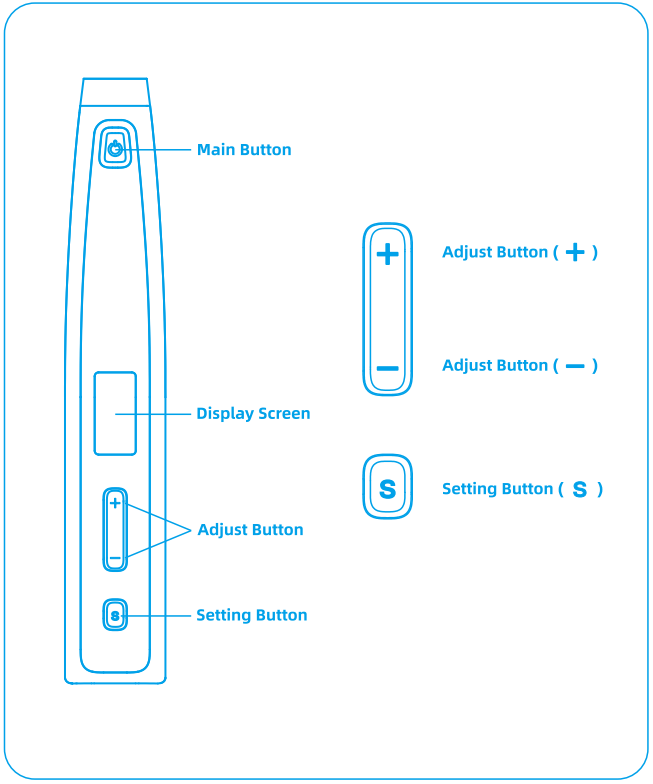


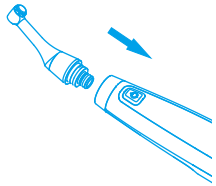
Fig.2 Handpiece and Button



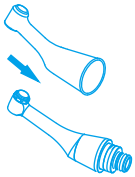
Guidance & Declaration – electromagnetic immunity			
The device is intended for use in the electromagnetic environment specified below. The customer or the user the device should assure that they are used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD)IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±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 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 and manufacturer's declaration - electromagnetic emissions		
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure that it used in such an environment.		
Emission test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR 11	Group 1	The device 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 device 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	

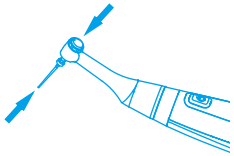
Fig.3 Contra-angle & File connection



1. Connect Contra-angle



2. Attach the Contra-angle Silicone Covers



3. Connect file

Warning

1) Do not place your hands near the motor connector while the motor is running, to avoid the risk of pinching or scratching.
2) Do not change the handpiece or perform any connecting or disconnecting connection operations while the motor is running.

Fig.4 Measuring Wire connection

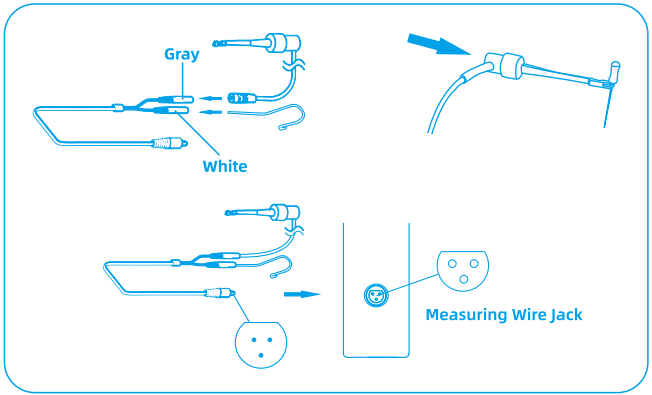
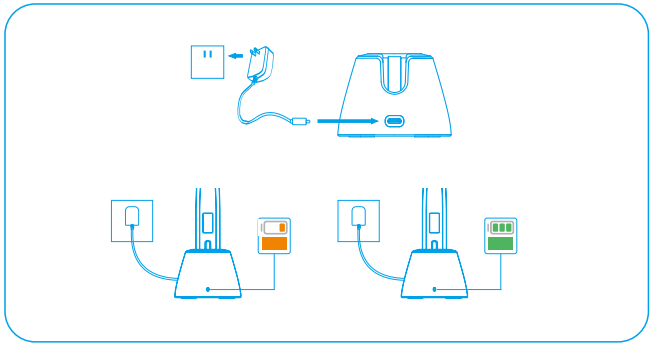


Fig.5 Charging



17/ 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	/

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.

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16/ 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.

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.
- Suggest using BENDECHK brand dentistry handset clean lubricant.

15/ Technical Specifications

Motor Handpiece	
Speed	100-2500 r/min
Torque	0.6-5.0 N·cm
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	
Material	File Clip: plastic PI with stainless steel; Lip hook: stainless steel

01/ Safety

Read the safety warnings carefully before using this device.
These safety warnings will instruct you to better use 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 mucosa.
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: 8 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.

12/ Disposal of Medical device

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



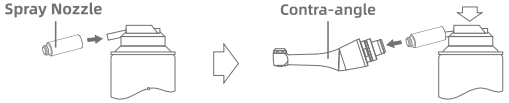
Follow your local and country-specific laws, directives, standards and guidelines for disposal.
> Medical device
> Waste electrical equipment
> Packaging

13/ Guarantee

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

14/ 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.



11/ Troubleshooting

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
	The root canal is in poor condition	Refer to chapter 5.2.3
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.

02/ Product introduction

2.1 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) Additionally, the device is suitable for removal and polishing of deposits on the surfaces of teeth and dental restorations (e.g., fillings and prostheses).

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

2.2 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.

2.3 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

03/ Installation

3.1 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.

3.2 Attaching the Contra-angle Silicone Covers

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

3.3 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.

10/ 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
	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		Serial number
	Do not re-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: SIGMASterilization 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°C, 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.	

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. Step-by-step from small to large, same type recommended.
- 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.

3.4 Connecting the Irrigation Needle (optional)

1) Attach the Endo Activator Contra-angle to the motor handpiece.
2) Slide the disposable protective sleeve over the Contra-angle.
3) Insert and secure the dental irrigation needle in the Contra-angle.

Warning

- Only use standardized, undamaged irrigation needles to avoid the risk of breakage or patient injury.
- Never operate the device in a dry root canal.
- For detailed instructions, please refer to the relevant product manuals.

3.5 Installing the Prophy Polishing Cup (optional)

1) Attach the prophy polishing cup to the Contra-angle, ensuring it is properly seated and securely locked in place.

Warning

- The rod of the dental prophy cups must comply with the requirements of Type 1 rod in ISO 1797.
- Installation and disassembly of dental prophy cups must only be performed when the motor is not in operation.
- The polishing cup is intended for single-use only if indicated by the manufacturer.

3.6 Apex Locator Setup

3.6.1 Connect 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.

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. • 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: 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: • 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.

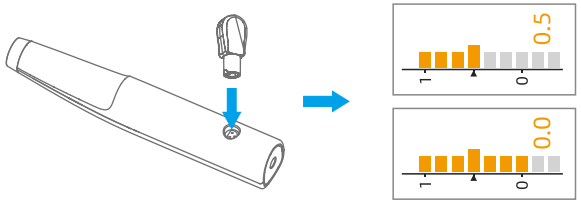
09/ Cleaning, Disinfection and Sterilization

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 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.

3.6.2 Connection Testing

1) Check with Tester

Connect the tester to the measuring wire jack on the back of the handpiece. Check that indicator bars light up between 0.0-1.0.



Caution

If the indicator bars does not light up between 0.0-1.0, stop using the device immediately and repaired it.

2) Connection Testing

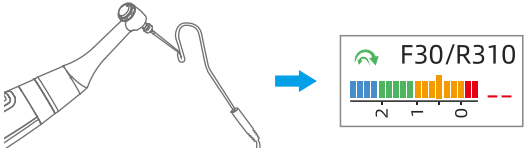
Touch the lip hook with the clip on the end of the file clip and check that all the indicator bars light up，as shown below:



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.

In Multi-Function mode（combined Motor and Apex locator）,contact the lip hook with the file on the Contra-angle handpiece. Check that all the indicator bars light up, as shown below:



Caution

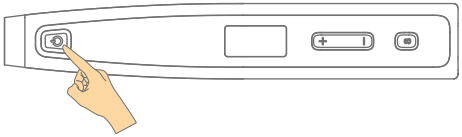
If the lip hook is in contact with the file clip or the root canal enlargement file, but the screen does not display full grid bars, it indicates that the measuring wire may be malfunctioning. Please contact your local distributor or the manufacturer for assistance.

04/ Usage

4.1 Power on/off

To turn on:
Long press the Main button until the screen lights up.

To turn off:
Long press the Main button again until the device shuts down.



8.2 Battery Charging

Refer to Fig. 5

1) Connect the AC adapter to the charging base,then plug the adapter into the power outlet. The indicator light on the base will turn on once the connection is complete.
2) Before charging, make sure to clean the magnetic connector at the bottom of the motor handpiece to ensure it is free from any dirt or contamination. Insert the motor handpiece fully into the charging base. The orange indicator light will illuminate to indicate charging.
3) Once charging is complete, the orange light will turn off and the green light will turn on.

Caution

- Always use the AC adapter provided with the device. Using a different adapter may cause electric shock, malfunction, or fire.
- Keep the charger and AC adapter at least 2 meters away from the patient.
- Do not use the battery charger with any device other than the designated motor.

Warning

- Do not touch the AC adapter during a lightning storm, as this could result in electric shock.
- Do not use the battery charger in wet or humid environments.
- Do not connect measuring wire, tester, or other accessories while charging the device.
- After charging is complete, disconnect the AC adapter from the power source and unplug the connector.

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 "OK", indicating that the device is functioning normally.
- If the screen displays "NG":
  a. Check for any obstructions or debris in the Contra-angle and clean it thoroughly.
  b. Ensure the battery is sufficiently charged.
  C. Repeat the calibration process.If the problem persists, contact the manufacturer or authorized service center for assistance.

08/ Battery and Charging

8.1 Battery Power

The number of bars on the display indicates the remaining battery level.



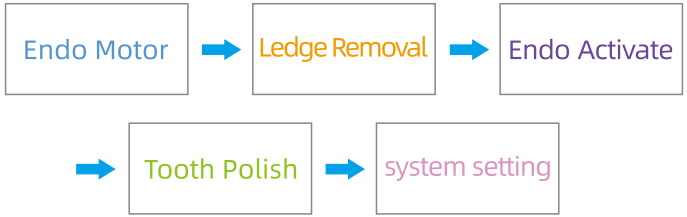
Note

Charge the battery as soon as only one bar remains.

4.2 Switching Modes

To switch between modes, long press the Setting button (S).

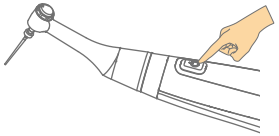
The device offers the following five operating modes:



4.3 Start/Stop Operation

To start the motor from the stand-by state, press the Main button.

To stop the motor, press the Main button again. The device goes back in stand-by state.



Warning

- Avoid pressing the Contra-angle push button during operation, as this may cause the file to detach or damage the device.
- Before use, run the device 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 Setting button (S).

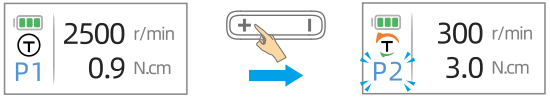
05/ Endo Motor Mode

This mode includes three sub-modes: Motor-Only, Apex Locator, and Multi-Function. When the measuring wire is not connected, the device defaults to Motor-Only mode.

5.1 Motor-Only

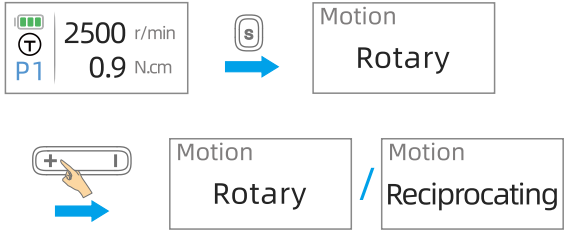
5.1.1 Selecting a User Programs

1) Press the Adjust button (+/-) to cycle through programs.
2) The Endo Motor mode offers nine user programs (P1-P9).
   - P1-P8 support rotary and reciprocating file systems.
   - P9 is preset for reverse rotation.



5.1.2 Setting Program Parameters

1) Press the Setting button (S) to cycle through available parameters.
2) Press the Adjust button (+/-) to change the selected value.
3) Long press the Setting button (S) or press the Main button to return to standby.
   If no operation is performed for 5 seconds, the settings will be saved automatically.



07/ System Setting

1) Long press the Setting button (S) to enter the system settings menu.
2) Press the Setting button (S) repeatedly to cycle through available setting items.
3) Press the Adjust button (+/-) to change the selected option.
4) Press the Setting button (S) again or wait 5 seconds to confirm and exit.

Screen Left Right	The device can be adjusted for left-handed or right-handed user by rotating the display 180°.
Apical Action ON OFF	ON: When enabled, the apex locator actively integrates with motor operation. This enables apex-linked functions such as auto start/stop, apical action, and auto slow-down for real-time shaping assistance. OFF: When disabled, the apex locator serves only as a visual reference. All apex-linked functions are inactive, and motor operation is unaffected by apex locator. Refer to Sections 5.3.3, 5.3.4, and 5.3.5 for detailed descriptions of apex-linked functions.
Auto start/stop ON OFF	ON: The motor starts automatically when the file is inserted into the canal. OFF: Auto Start/Stop is disabled. Press the Main button to manually start/stop the motor.
Auto slowdown ON OFF	ON: Enable Auto Slowdown. OFF: Disable Auto Slowdown.
Calibration Start Calibration • • • Calibration OK Calibration NG	1) Press the Adjust button (+/-) to start torque calibration. 2) The process runs automatically and cannot be paused or canceled. 3) Once complete, the result (OK or NG) will be displayed, and the system will automatically return to the Endo Motor Mode (Program P1) interface.



Working

6.3 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.

6.3.1 Select Gear

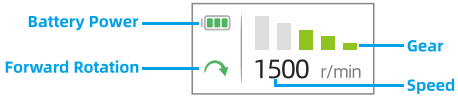
1) Tooth Polish offers 5 adjustable gears, each corresponding to a speed setting from 500 to 2500 r/min in 500-step adjustments.
2) Press the Adjust button (+/-) to switch gear.

6.3.2 Change the rotation direction

1) Press the Setting button (S) to switch direction.



Prompt



Standby & Working

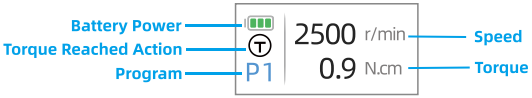
5.1.3 Parameters List and Display Screen

Parameter availability depends on the selected motion type:

Motion Type	Parameter	Adjustment Range
Rotary	Speed	100–2500 r/min (Speed range: 100–1000 r/min in 50 r/min increments; 1000–2500 r/min in 100 r/min increments.)
	Torque	0.6–5.0 N·cm (increments of 0.3 N·cm)
	Reach Torque Action	Auto Stop,Auto Reverse,Auto Reciprocate Refer to Section 5.1.4
Reciprocating	Speed	150–450 r/min (increments of 150 r/min)
	Forward Angle	30°–330° (increments of 10°)
	Reverse Angle	30°–330° (increments of 10°)
Reverse	Speed	100–2500 r/min (Speed range: 100–1000 r/min in 50 r/min increments; 1000–2500 r/min in 100 r/min increments.)

1) Rotary:

The file rotates continuously in the forward direction.



Standby



Working

2) Reciprocating:

The file alternates between forward and reverse directions.



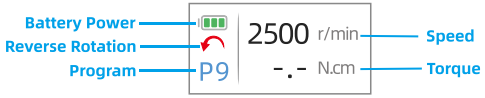
Standby



Working

3) Reverse:

The file rotates in reverse; only speed is adjustable in this mode.



Standby



Working

5.1.4 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.





Working

> **Note**
>
> Due to this mode's equal-angle reciprocating motion, the device alternates between clockwise and counterclockwise rotations, eliminating the need for continuous reverse rotation.

6.2 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.

6.2.1 Select Gear

Endo Activate has 4 gear.

1) Press the Adjust button (+) to increase the desired gear; Press the Adjust button (-) to reduce the desired gear.



Prompt



Standby

06/ Other Mode

6.1 Ledge Removal Mode

Ledge Removal Mode helps the file bypass ledges in curved canals by automatically adjusting rotation or switching to fine reciprocation. It reduces the risk of file separation and maintains the original canal path for safer instrumentation.

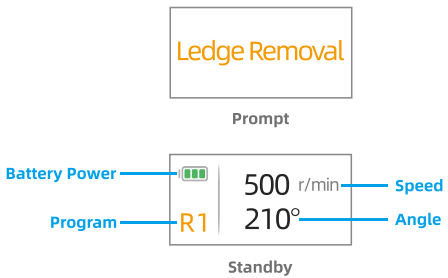
6.1.1 Select User Programs

1) Press the Adjust button (+/-) to cycle through programs.
2) The Ledge Removalr mode offers three user programs (R1-R3).

6.1.2 Set User Program parameters

1) Press the Setting button (S) to cycle through available parameters.
2) Press the Adjust button (+/-) to change the selected value.
3) Press the Main button to confirm and exit, or wait 5 seconds for auto-exit.

Parameters	Parameter Adjustment Range
Speed	100r/min~500r/min(100r/min increments)
Angle	30° to 330° (10° increments).



2) Auto Reverse:

The motor reverses its rotation.
If the torque falls below 60% of 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 60% 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.



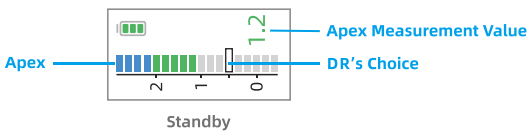
These functions enhance safety and efficiency during root canal treatment by preventing file separation and over-instrumentation.

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

5.2 Apex Locator

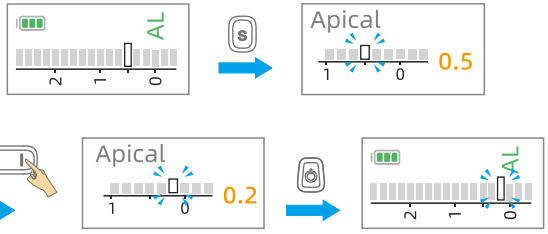
While the measuring wire is connected, the device enters the Apex Locator mode automatically.

5.2.1 Display Screen Overview



5.2.2 Setting the DR's Choice

1) Press the Setting button (S) to activate apical setting.
2) Press the Adjust button (+/−) to adjust the DR's Choice. (Long press for faster adjustment)
3) Press the Main button to confirm and exit, or wait 5 seconds for auto-exit.



Note

- The DR's Choice can be adjusted within a range of 1.0 to 0.0, with available positions at 1.0, 0.9, 0.7, 0.5, 0.4, 0.2, and 0.0.
- Apical Action and Auto Slow Down are triggered by the the DR's Choice.

5.2.3 Measurement

1) Place the lip hook securely on the patient's lip, opposite to the tooth being measured.
2) Ensure proper connection between the file clip, measuring file, and measuring wire.
3) Slowly insert the file into the root canal. The indicator bars in meter show the location of the file.

Note

- If Apical action is turned OFF, the Auto start/stop function will be disabled.
- Manual control takes priority over automatic activation — the motor can always be stopped manually.

5.3.6 Auto slowdown

To enable or disable this function, long press the Setting button (S) to enter the system settings menu. Please refer to chapter 7 for detail.

When the file reaches the "1" position in the canal, the motor will automatically slow down to 100 r/min. Once the file exits this position, the motor returns to the preset speed.

Note

If Apical action is turned OFF, the Auto slowdown function will be disabled.

※ Endo Motor Mode Parameters Availability Table

Mode / Parameters	Motor-Only			Apex Locator	Multi-Function		
	Rotary	Recipro.	Reverse		Rotary	Recipro.	Reverse
Speed	YES	YES	YES	NO	YES	YES	YES
Torque	YES	NO	NO	NO	YES	NO	NO
The DR's Choice	NO	NO	NO	YES	YES	YES	NO
Forward Angle Reverse Angle	NO	YES	NO	NO	NO	YES	NO
Reach Torque Action	YES	NO	NO	NO	YES	NO	NO
Apical Action	NO	NO	NO	NO	YES	YES	NO
Auto start/stop	NO	NO	NO	NO	YES	YES	YES
Auto slowdown	NO	NO	NO	NO	YES	YES	NO

Protection Action:

1) Auto Stop:

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

2) Auto Reverse:

When the torque reaches the preset value or the file reaches the DR's Choice position, the motor will automatically reverse rotation.

If the torque decreases below 60% 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.

3) Auto Reciprocate:

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

If the torque decreases below 60% 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.

5.3.5 Auto start/stop

To enable or disable this function, long press the Setting button (S) to enter the system settings menu. Refer to Chapter 7 for detailed instructions.

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.

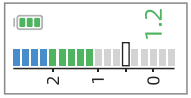
When disabled, motor operation is controlled manually via the Main button.

Warning

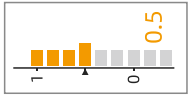
- Check that the lip hook and file clip are properly connected; incorrect connections will result in inaccurate measurements;
- Lip hook may cause adverse reactions in patients with metal allergies; ask the patient if he/she has any metal allergies before use;
- Do not use medicinal solutions such as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

There is no sound when the file does not reach 2.0.

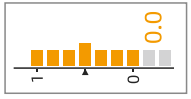
There is slow beeping sound when the file reaches 1.0-2.0.



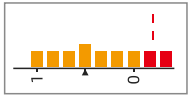
The beeping sound Interval become frequently when the file reaches 0.5-1.0.



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.



Warning

- In some cases such as a blocked root canal, a measurement cannot be made.
- When a file enters the root canal and the screen never shows the position of the file, the device may be malfunctioning.
- 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.

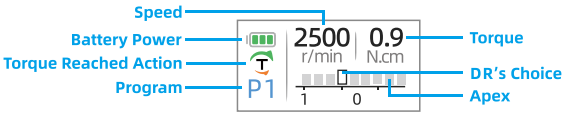
5.3 Multi-Function

Connect the lip hook, file clip and measuring wire, contra angle and file. Press the Adjust button (+/-) or the Main button to enter the Multi-Function.
In this mode, you can set torque reach action, apical action, auto start/stop, and auto slow-down functions.

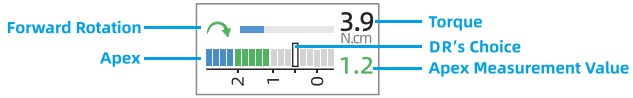
Note

Apical action, auto start/stop, and auto slow-down are apex-linked functions and are only available in Multi-Function mode. These functions are not supported in Motor-Only mode.

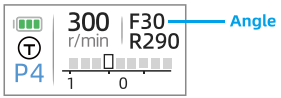
5.3.1 Display Screen Overview



Rotary Standby



Rotary Working



Reciprocating Standby



Reciprocating Working

5.3.2 Selecting a User Programs

1) Short press the Adjust button (+/-) to cycle through programs.
2) The Multi-Function mode offers nine user programs.
   - P1-P8 support rotary and reciprocating file systems.
   - P9 is preset for reverse rotation.
   - After P9, the screen switches to the Apex Locator mode.

5.3.3 Setting Program Parameters

1) Press the Setting button (S) to cycle through available parameters.
2) Press the Adjust button (+/-) to change the selected value.
3) Press the Main button to confirm and exit, or wait 5 seconds for auto-exit.

Note

The adjustable parameter range in Multi-Function mode are the same as those in Motor-Only mode and Apex Locator modes.

5.3.4 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 (DR's Choice).