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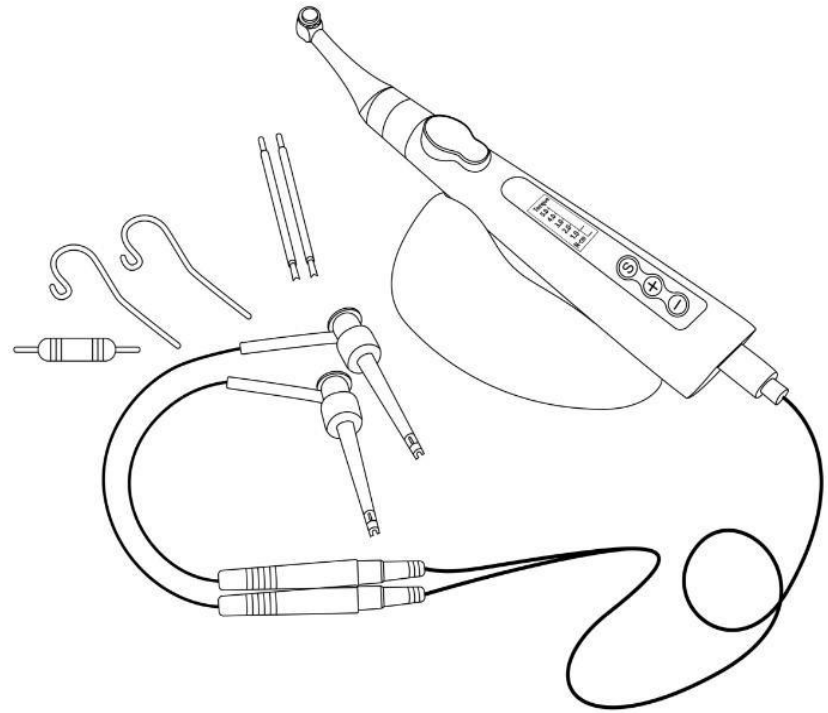
PRODUCT MANUAL

ENDO MOTOR WITH BUILT-IN APEX LOCATOR

(DR-E3)



dorit® Hello Medical Technology (Guangdong) Co, Ltd.

INTRODUCTION

Thank you for choosing our company's dental endo motor with bulit in apex locator (DR-E3) . This device is an important tool for dental root canal therapy , which is mainly driven by a motor and Micro controlled converting electrical energy into mechanical energy to achieve the goal of expanding the root canal.

This product can automatically and manually reverse (counter clockwise rotation) and automatically stop working , with separate apical positioning mode / separate root canal preparation mode / while measuring and preparation mode . It also has a memory function for each different operation. This product can gently start and stop working, and the process is very comfortable. At the same time , when the file suddenly encounters vibration, it will not break. After each use, the temperature of autoclaving for contra angle and file of this device should not exceed 135 ℃.The power supply of this device adopts a large capacity lithium battery, which can be used for a long time after full charged. Due to the absence of wires, it is very convenient to use. The shell adopts a humanized design, making the user feel more comfortable during operation.

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- **Main structure:**

  Host , contra angle , power adapter, measuring wire , lip hook , file clip and base

- **Scope of application:**

  Used in root canal therapy , during the root canal preparation stage for shaping and cleaning . This device includes an apical positioning function and can be used to assist in measuring the length of root canal in therapy work .

- **Applicable population:**

  Patients with dental pulp disease or periapical disease

- **A pplicable site:**

  Root canal of teeth

- **Usage environment:**

  Hospital dental department , dental clinic indoor use

- **Functional characteristics:**

  Ten memory programs

  Four working modes

  Apical positioning mode

  Speed adjustable

  Torque adjustable

  Rotation angle adjustable

* Host

Size: Diameter 30×210mm

Standard working voltage: D .c .3

* Power Adapter

Input voltage: 100 V~240V~ 50/60Hz

Output voltage: D .c .5V, 1A

* Battery

Type: Lithium ion battery

Capacity: 1500 mA h

Charging voltage: 5 V

* Program Parameters

Working modes: 4 kinds

Standard configure of contra angle: 16 : 1

Net weight of device: 23 0 g

Speed: 120~550 rpm

Torque: 0 .6 ~ 3 . 0 N•cm

* Transportation and Storage Condition

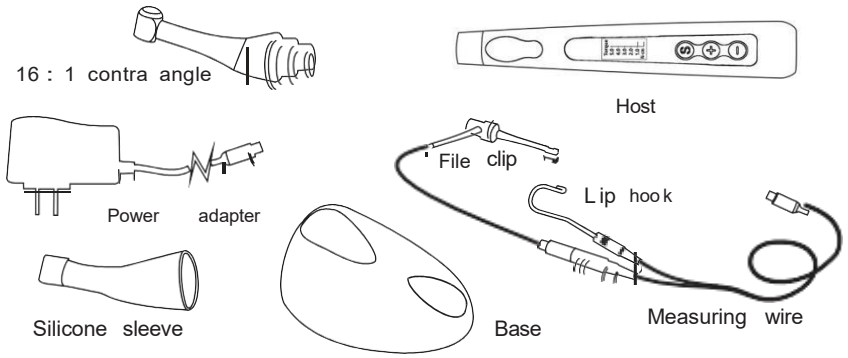
Environmental temperature: -20~55 ℃

Relative humidity: ≤ 80%

Atmospheric pressure: 70 ~ 1 0 6 Kpa

INSTALLATION

The packaging of the endo motor with built - in apex locator (DR-E5) includes a 16 : 1 contra angle , a host , a power adapter , a measuring wire , 2 lip hooks , a file clip , 2 silicone sleeves , and a base ,which are separately packaged .



Note : Please keep the device in a non working status during installation or disassembly .

Connection of charging wire / measuring line:

1) Directly plug the connection port of the power adapter into the USB port at the bottom of the host , and connect the power to charge (as Figure a) .

2) Insert the lip hook into one end socket of the measuring wire (as Figure b) , insert the file clip into the other end socket of the measuring wire (if necessary) , clamp the file with the file clip

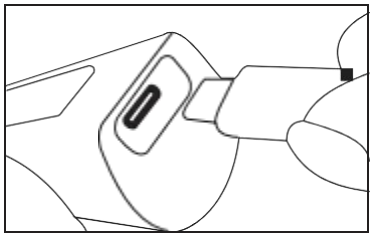


Figure a

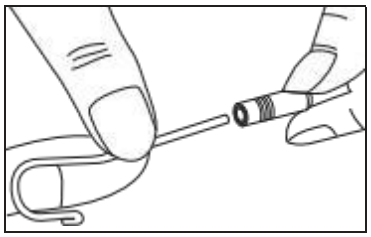


Figure b

(as Figure c) (if necessary) , and then connect the measuring wire interface to the USB port at the bottom of the host (as Figure a) to complete the connection of the measuring wire .

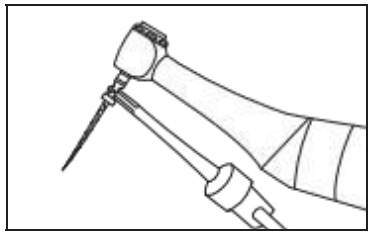
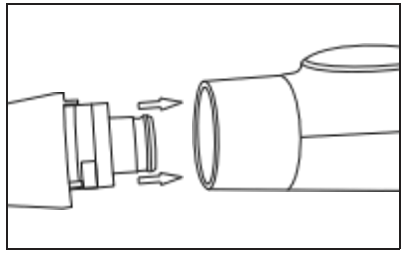
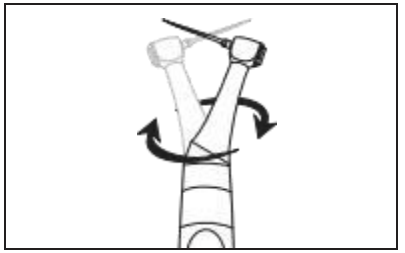


Figure c

Note: Before each use , a wire connection test must be carried out . Press the power key and use the lip hook to contact the file of the host . Confirm that the display screen shows a screen for measuring the root canal length , and all the root canal length indicator bars are displayed with a stable display of the figure "-3" .

Installation and disassembly of contra angle :





- When you need to connect contra angle to the host , hold the contra angle , then insert it into the corresponding slot of the host until you hear a " click" , contra angle installs well .
- When you want to remove it , pull it out directly in straight direction .
- The contra angle can rotate 360° and freely switch angles to meet the treatment needs of different tooth positions .

Installation and disassembly of dental file:

- Insert the file into the shaft hole of contra angle until hear voice “ click” (do not press the button of contra angle while inserting) , then try to take off the file without pressing the button of contra angle , if the file cannot be taken off, that means the file is installed well (as Figure a) .
- When you want to remove it , please press the button on the contra angle and take off the file directly at the same time (as Figure b) .

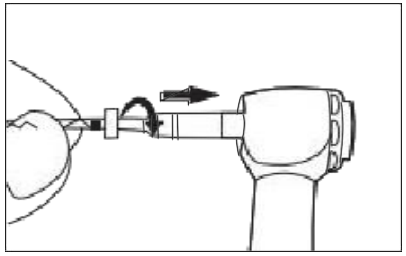


Figure a

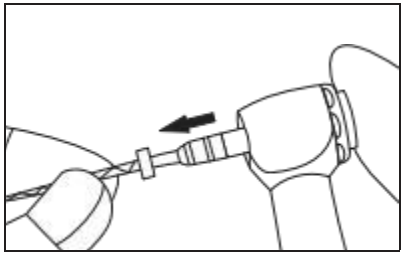


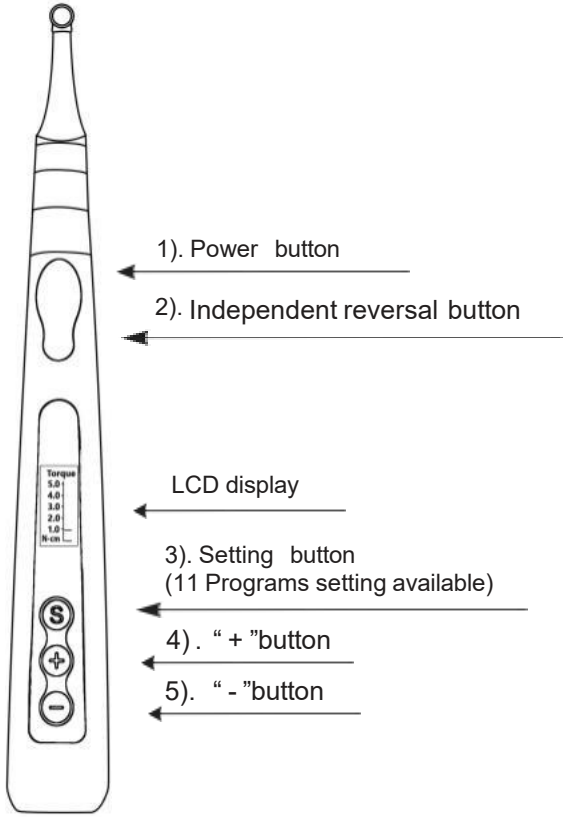
Figure b

If you need to use it for apical positioning operation , you need to connect the measuring wire , please refer to measuring wire connection .

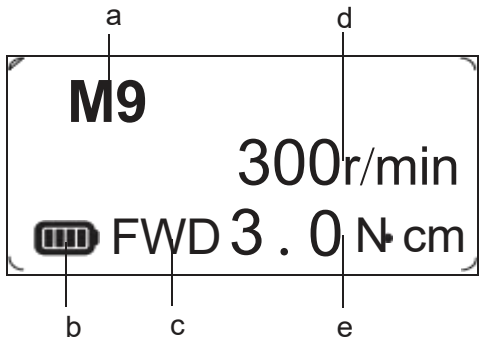
Installation completed .

Function button

1) . Power button
2) . Independent reversal button
3). Setting button
4) . “ + ”button
5). “ - ”button



Display screen symbol



a	**M9**	Program number symbol
b		Power supply indicator
c	FWD	Automatic forward continuous mode Adjustable working speed: 120~ 550rpm Adjustable working torque: 0 .6~ 3 .0N•cm
	REC	Automatic forward & reverse mode F : Adjustable forward rotation angle(30°~370°) R : adjustable reverse rotation angle (90°~370°)
	REV	Automatic reverse continuous mode Adjustable working speed: 120~ 550rpm Adjustable working torque: 0 .6~ 3 .0N•cm
	APEX	Apex locate mode
d	Contra angle output speed , unit: r/ min	
e	Contra angle output torque , unit: N/ cm	

Operation

Step 1: Press the power button to enter the standby state , and long press the power button to shut down.

Step 2: Must be in standby state , press the setting key first , then press " +" / "-" to select a different program.

Step 3: In standby state: a fter selected the program , press the power button to enter the working state.

Step 4 : In working state:

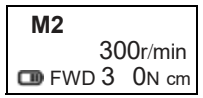
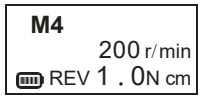
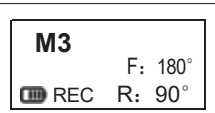
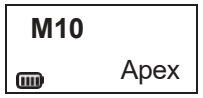
a) Press the power button to stop working and enter the standby state;

b) Long press the power button to reverse and continue working (manual reverse mode) .

Step 5 : In stand by state , if no any operation within 8 minutes , the machine will shut down automatically.

Note: When the battery voltage is lower than the set value , the power display sign will flash , please stop using and charge in time .

Working mode

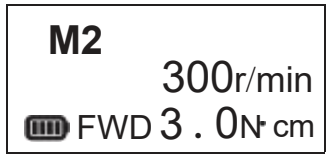
FWD		a . Automatic forward rotation , automatic reversal after resistance , when no resistance will continue to work after reversal b . In working state , long press the power button to manually reverse
REV		Automatic reverse continuous mode
REC		Automatic forward & reverse mode
Apex		Apex locate mode

Parameter setting

Adjust speed	Speed 300 rpm	In the standby state of FWD or REV mode , press the setting key (S key) when the speed (rpm) flashes , press "+" and "-" to adjust the numerical value according to the actual situation of the operator (adjustable from 120 to 550)
Adjust torque	Torque 3.0 N•cm	In the standby state of FWD or REV mode , press the setting key (S key) when the torque (N•cm) flashes , press "+" and "-" to adjust the numerical value according to the actual situation of the operator (adjustable from 0 .6 to 3 .0 N .cm)
Adjust angle	Forward Angle 60 deg	In the standby state of REC mode , press the setting key (S key) when Forward Angle (F) flashes , press "+" and "-" to adjust the numerical value according to the actual situation of the operator (adjustable from 30 ° to 370 °)
	Reverse Angle 90 deg	In the standby state of REC mode , press the setting key (S key) when the Reverse Angle (R) flashes , press "+" and "-" to adjust the numerical value , according to the actual situation of the operator (adjustable from 90 ° to 370 °) .

Note: The values of rotational speed and torque can be viewed in real- time under working conditions , and the root canal length be tested in working condition also . In working status , program switching is not allowed .

Program Interpretation



In standby state , press " +" "-" to select a different program .

1) The speed of FWD (forward rotation) is 120-550 , and the torque (TQ) is adjustable from 0 .6 - 3 .0 . If it exceeds the set value range , it will automatically reverse . If the force was adjusted back to the normal value , it will resume forward rotation and continue working .

Under this mode:

Automatic stop/reverse function switch	Auto Start & Stop I	Press the Set key (S key) when Auto Star & Stop appears , press "-" to start . Under the working state of measuring and preparation , the root file will automatically reverse and stop when it reaches the root tip .
Automatic reach the root tip reversal function switch	Apical Reverse I •	Press Set key (S key) when Apical Reverse appears , press "-" to turn it on . When the root file reach the root tip , it will automatically reverse under the condition of measuring and preparation .
Automatic root tip reduction function switch	Apical Slow Down I •	Press the Set key (S key) when Apical Slow Down appears , press "-" to turn it on . When the root file reach the root tip , it will slow down automatically.
Automatic torque reduction function switch	Apical Torque Decrease I •	Press the set key (S key) when the Apical T orque Decrease appears, press "−" to turn it on . Under the measuring and preparation, the torque at the root file reach the root tip will decrease .

2) REV (reverse) speed is 120~550 , torque (TQ) is 0 .6~ 3 .0 adjustable (one-way reverse: if the value exceeds , it will continue.

3) The forward rotation (F) Angle of REC is: 30 ~ 3 70 , and the reverse (R) Angle is: 90 ~ 37 0 . The parameters can be the same , and adjustable according to the actual situation of the operator.

Note: 10 preset memory functions can be dynamically adjusted according to real- time (M0~ M9) .

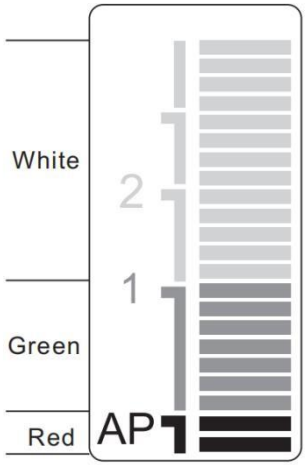
M10 is Apex root measurement mode

In M10 mode , insert one end of the root measurement data cable into the USB port of the host , the lip hook into interface 1 , and the file clip into interface 2 (universal interface , refer to 4 .1) Can be tested:

1) When the screen displays a white area , the root canal needle is located at the front end of the apical hole;

2) When the screen displays a green area , the root canal needle reach near the root tip;

3) When the screen displays a red area, a continuous beep will soun c when the root canal extends beyond



Note:The root test line is not plugged into the host , and the root test function cannot be used.

NOTES

1) Do not use this device during charging;

2) Do not use files that are bent , deformed , cracked , or do not meet specifications to avoid file breakage and damage accidents.

3) The host cannot be sterilized at high temperatures, and surface dirt can be wiped with alcohol.

4) After charging , the power adapter plug should be unplugged from the power socket.

5) Do not use or place this device under high temperatures to prevent short circuits discoloration caused by heat.

6) This product belongs to electronic products and does not have waterproof function.

7) Please use original matching power adapter, battery and other accessories to avoid causing device short circuits.

8) Please use the root canal file that meets international standards.

9) Please use the contra angle provided or approved by manufacturer, otherwise cause the device to malfunction，

10) Be sure to use gloves or silicone sleeves during treatment operations.

11) If the device malfunction , please do not disassemble or repair the equipment without authorization.

12) It is recommended not to use this device for patients who are equipped with an Implanted cardiac pacemaker (or other electrical equipment) and are warned not to use small household appliances such as electric shavers , hair dryers , etc .

Maintenance of the host

- If it is not used for a long time , please charge it every 15 days to ensure that the battery life will not be reduced due to low battery level;
- After the host is fully charged , the power supply should be stopped within two hours , otherwise it may damage the battery;
- After use , wipe the shell of the host with a soft cloth and alcohol . After the surface of the host is completely dry, store it in a dry and well ventilated place .

Note:

* It is strictly prohibited to use high concentration ethanol or corrosive liquids to wipe the host shell and measuring wire .

* Users are not allowed to disassemble or replace batteries without permission . If you have any questions , please contact the manufacturer or local distributor.

Maintenance of contra angle

- After daily use , use spray lubricant to lubricate the contra angle , spray lubricant into the shaft center from the file insertion port for at least 2 seconds each time , so as to maintain the service life of the shaft .
- If the workload is large , it should be sprayed twice each day at noon and afternoon after use .

Common Malfunction and Treatment

No.	Malfunction	Possible Causes	Treatment
1	The device cannot be turned on	Low battery level	Please charge
		POWER key- press time is too short	Please press POWER key for more than one second
		Battery damaged	Please contact the dealer or manufacturer
2	The screen is not displayed	Circuit board failure	Please contact the dealer or manufacturer
3	Abnormal torque display	Lack of maintenance for contra angle	Maintain the contra angle
4	The product cannot be charged	Poor connection between power adapter and host	Check connections
		Non original adapter	Please check and use the original adapter
5	Apical positioning cannot be displayed	No wires connected	Please connect the measuring wire
6	Apical positioning display is unstable	Poor contact between lip hook and oral mucosa	Move the lip hook to a position that maintains good contact with the oral mucosa
		Stained with liquid Medicine and debris on the tooth surface	Clean the tooth surface
		Caries on adjacent surfaces	The measuring current will flow from adjacent caries teeth to the gums, resulting in incorrect measurement of root canal
		A cyst at the apex of the tooth	Cannot measure the length of the root canal accurately
		File clip dirty or damaged	Clean the file clip with disinfectant alcohol or replace the file clip

DISINFECTION

Please only autoclave root canal files , file clips , lip hooks , silicone sleeves, and contra angle.

After each use, high-temperature and high-pressure sterilization must be carried out according to the following methods.

1）Remove the root canal file and silicone sleeve from the contra angle, and then use a soft brush to clean the dirt on the file clip, lip hook, silicone sleeve, and contra angle. Then, wipe them with a disinfectant alcohol cotton ball.

2）When there are stains on the surface of the host , please use a soft cloth to apply some neutral cleaning agent to wipe it off , and then use a damp cloth to wipe it clean.

3）Lubricate the contra angle. (refer to maintenance methods)

4）Wrap it in a sterile bag and mark it.

5）The temperature should not exceed 135 (such as 121 ℃ for 20 minutes and 132 ℃ for 15 minutes) during autoclaving.

6）When not in use, please seal it in a sterile bag and place it in a dry and well ventilated place.

TRANSPORTATION AND STORAGE

Transportation and Storage Condition:

Environmental temperature: - 20~55 ℃
Relative humidity: ≤ 80 %
Atmospheric pressure: 70 - 106 Kpa

Avoid storage and transportation in the following environments:

(1) Direct sunlight/strong light.
(2) A place directly blown by cold (hot) airflow such as air conditioning, electric stove, heating, humidifier, etc.
(3) Places with chemicals or harmful corrosive gases.
(4) There are areas with water seepage, splashing, excessive dust, excessive vibration, and uneven flooring.
(5) Throwing, stepping, stacking heavy objects, etc.
(6) Places where chemicals are stored, dusty, vibrating/shaking, and damp.

HARMLESS-DISPOSAL TREATMENT AND RECYCLING

The package should be recycled. Metal parts of the device are disposed as scrap metal. Synthetic materials , electrical components , and printed circuit boards are disposed as electrical scrap. The lithium batteries are disposed as s pecial refuse . Please deal with them according to the local environmental protection laws and regulation . Do not dispose of waste as domestic waste .

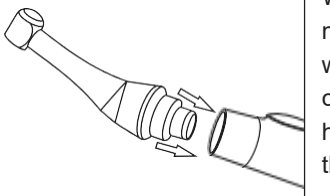
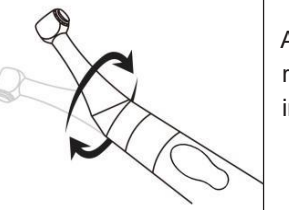
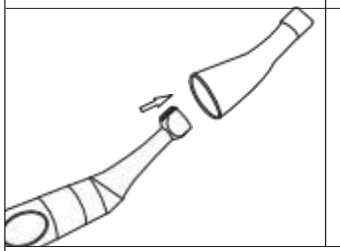
Component Name	Toxic and harmful substances or elements					
	Pb	Hg	Cd	Cr6+	PBBs	PBDE
base	O	O	O	O	O	O
host	O	O	O	O	O	O
booster tube	O	O	O	O	O	O
power adapter	O	O	O	O	O	O
Mechanical components such as nails, nuts, washers, etc	O	O	O	O	O	O

O: Indicates that the content of the toxic and harmful substance in all homogeneous materials of the component is below the limit requirements specified in SJ/T - 11363-2006 "Limits for Toxic and Harmful Substances in Electronic Information Products".

×: Indicates that the content of the toxic and harmful substance in at least one homogeneous material of the component exceeds the limit requirements specified in SJ/T11363-2006. (This product meets the EU RoHS environmental protection requirements; at present,there is no mature technology in the world to replace or reduce the lead content in electronic ceramics, optical glass, steel and copper alloys.)

According to the "Management Measures for Restricting the Use of Hazardous Substances in Electrical and Electronic Products ", "Regulations on the Recycling and Disposal of Waste Electrical and Electronic Products", and relevant standards, please comply with the safety and usage precautions of the product, and recycle or dispose of the product in appropriate ways according to local laws and regulations after use.

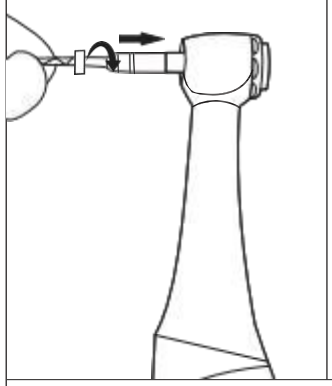
Installation and disassembly methods of contra angle

Install the contra angle and the Insulating Sleeve	
	When installing the contra angle to the machine , hold the bending machine head with one hand and insert it into the corresponding positioning slot on the handle until a " click" sound is heard , that the contra angle has been installed .
	After the contra angle was installed , rotate it to an appropriate Angle according to the actual application requirements
	After the contra angle is installed , put it into the Insulating sleeve .

Note:

- Please use the original contra angle and ensure that contra angle rotates properly before use .
- Before install the contra angle , ensure that the device is in the state of stop rotation .
- After contra angle was installed , pull gently to confirm whether it is firmly installed .

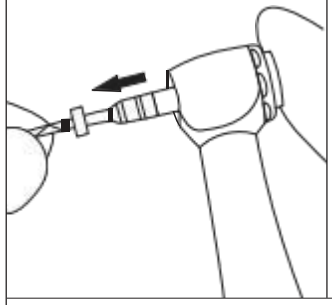
Install the root canal file



Do not press the back cover of the press while inserting the file needle . Insert the file into the shaft hole of the contra angle , turn the file needle slightly until you hear a click . File needle is installed .

* Do not use qualified files

Remove the dental file



Press and hold the cap of the contra angle , pinch the dental file , and gently pull it out to remove the dental file

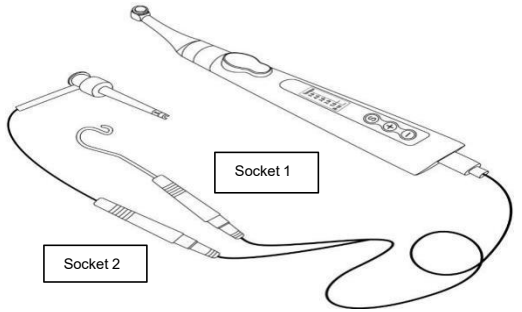
Note:

- After the root canal file was installed , gently pull the root canal file to ensure its installation is accurate and firm .
- When remove and assemble root canal files , be careful not to be scratched .
- When install or remove root canal files , ensure that the equipment is in the stop rotating state .

Installation and disassembly methods for measuring data cables

Installation: Connect the host to a measuring wire . Connect the lip hook to the white socket 1 , and the file clamp to the white socket 2 .

Disassembly: Directly unplug the data cable and separate it from the body.



Short-circuit test

When the file clip clamp the root canal file and the lip hook touches the root canal file , the screen displays -3 and blinks as normal .

Note: Please keep the machine in non-working state when installing or removing the contra angle .

Battery model specification: 18500-3 .7-1500 (5 .55Wh)
Type: Lithium-ion battery
Cell size: 18500
Battery capacity: 1500mA h
Battery life: more than 3 years in conventional environment
Replaceable parts:

1	16 ： 1 contra angle	4	File clip
2	File	5	Measuring ire
3	Lip Hook	6	Silicone sleeve

If this equipment cannot function properly due to quality problems within one year from the date of sale , our company is responsible for free maintenance .

(Consumables such as batteries are not covered by this warranty)

If one of the following situations occurs , the company will only provide paid maintenance:

* Damage caused by the user' s failure to operate , maintain , or store according to the instructions , or due to the user' s carelessness;
* If the user disassembles the machine on their own;
* Damaged due to using different parameters from the original battery by the user;
* Without warranty card or purchase voucher, or self altering;
* Damage caused by uncontrollable factors;
* Exceeding the free maintenance period .



① . Host ..... 1 pc
② . 16: 1 Contra angle ..... 1 pc
③ . Lip Hook.....2 pcs
④ . File clip..... 1 pc
⑤. Measuring wire..... 1 pc
⑥ . Silicone sleeve.....2 pcs
⑦ . Base..... 1 pc
⑧ . Power adapter.....1 pc
⑨ . Probe.....2 pcs
⑩ . Tester..... 1 pc

Warranty Card

Item Name:	Item No.:
Serial No.:	Date of purchase:
User Name:	Invoice No. :
Company Name:	
Address:	
Remark:	

Client Information

Client Name	
Company Name	
Contact Number	
Address	
Invoice No	
Date of Purchase	
Remark	