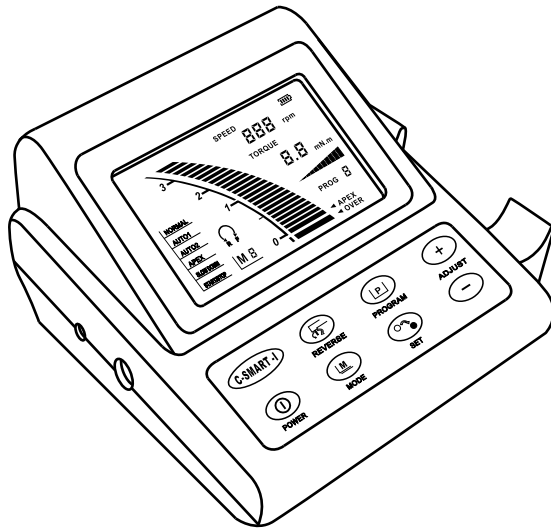


ENDODONTIC TREATMENT INSTRUMENT

C-SMART-I

Us e manual



*Thanks for applying the *C-SMART* endodontic treatment instrument. For the sake of safety and efficient use of the product, please read this manual first.

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I Safety caution

Warning: before use, please read the safety instruction carefully for making good use of this instrument.

1. This unit must be used comply the user's guide, not for other purpose. Please refer to the usage instruction strictly. We won't take the responsibility for the damage caused by improper use.
2. Before using the main power, make sure the power voltage is according with the adaptor voltage range. Improper input voltage will damage the unit and cause danger to the operator or the patient.
3. Do not drag the wire, which connects to the endo motor emphatically. Or it would be broken or be loosened and then affect the natural use.
4. Please use the original accessories, such as: endo motor, adaptor, and battery. We won't take the responsibility to any problem or damage caused by using other parts, which are not supplied by us.
5. To avoid electric shock, please do not insert any other parts into the unit; it may cause electric shock or damage.
6. Avoid the detergent going into the unit, in case that causes the short circuit or problem.
7. Please turn off the instrument immediately when something wrong. It's not allowed to modify the unit at any condition. Any disassembling or modification may cause the invalidation of the guarantee.
8. Please use the intact standard file. Or it would cause damage to the patient while working.
9. Prevent the instrument from environmental electromagnetic interference. When there is a patient who is using the cardiac pacemaker, or there is an electronic operation, please do not put the machine around.
10. Unstable voltage and being under electromagnetic environment will interfere the normal operation.
11. When discard the accessories, please abide with the local regulation, if necessary, contact our service centre to recover it.

12. This unit is just for the professional user.

II Introduction and technical parameter

Intended use:

C-Smart Endo Motor is the supplementary root-canal treatment device, which can assist the dentists to operate more standard root-canal in the process of root-canal treatment 1.

Features:

- Colorful, wide LCD screen
- Rotation speed and torque can be adjusted, with 9 memory settings.
- Automatic torque reverse
- Dual-frequency apex locator
- 9 operation modes
- Automatic apex reverse and stop
- Automatic slow down in apex zone
- Automatic motor start and stop
- High capacity Li-ion rechargeable battery and can work with either battery or adaptor
- Automatic power off and automatic memorized

Main technical parameter :

Adaptor voltage: Input 100-240VAC 50/60Hz

Output 10VDC / 1.5A

Battery: rechargeable Li-ion battery DC7.4V

Power: 5W

Current: ≤500mA

Rotation speed: 125-625rpm

Torque: 6-52mN.m

Protection type against electrical shock: class II

Protection against electrical shock: type B

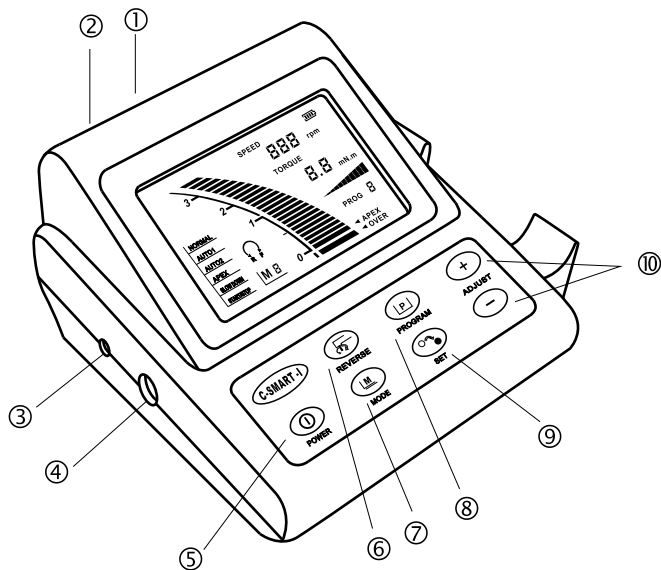
Protection against harmful ingress of water or particular matter: drip-proof equipment (IPX1)

III Standard configuration:

1. Main unit	1pcs
2. Adaptor	1pcs
3. Motor handle	1pcs
4. Contra angle(CX235-1)	1pcs
5. Foot switch	1pcs
6. Test wire (single & dual hole)	2pcs
7. File holder	2pcs
8. Stainless electrode	4pcs
9. Handle base	1pcs
10. Usage manual	1pcs

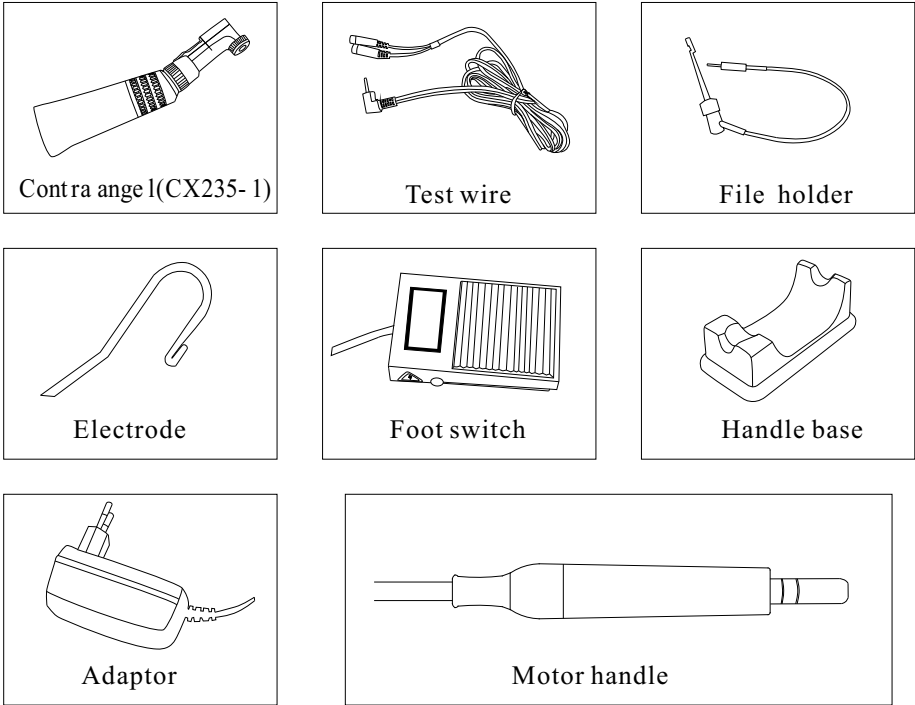
IV Structure and theory

Main unit:

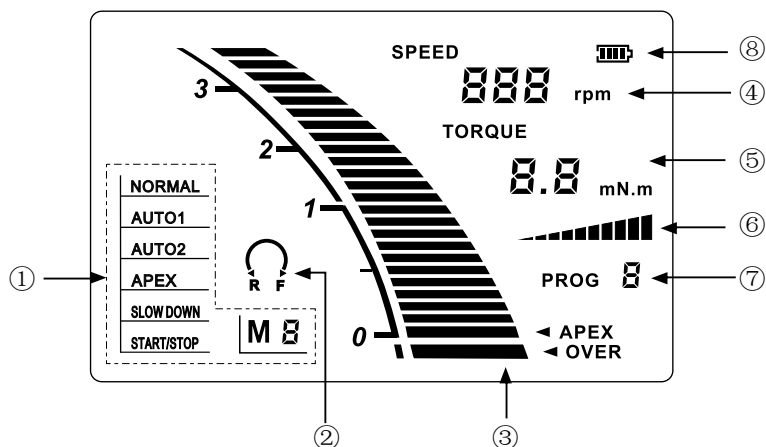


- ①. Hole for adaptor
- ②. Hole for foot switch
- ③. Hole for test wire
- ④. Hole for endo motor
- ⑤.POWERon/off button
- ⑥.REVERSE.....forward/reverse button
- ⑦.MODE.....mode select button
- ⑧.PROGRAM.....program select button
- ⑨.SET.....set button
- ⑩.ADJUST “+”& “-”.....adjust button

Parts:



LCD display description



- ① Mode module
- ② Forward & reverse sign: display for forward or reverse rotation
- ③ Apex locator module
- ④ Rotation speed setting value
- ⑤ Torque setting value
- ⑥ Current torque
- ⑦ Program number
- ⑧ Battery power display

V Assemble

1. Please put the instrument on a solid place.
2. Insert the foot switch connector into the hole on the main unit
3. Insert the motor wire connector into the hode on the main unit.
4. Connect the 1:1 contra angle to the motor and clamp the file into the contra angle. And then put the handle on the handle base.
5. Insert the adaptor into the hole on the main unit

Notice: when the instrument is being used, please don't use the adaptor for avoiding the electromagnetic interference.

6. If only use the apex locator function (M4), please insert the test wire (dual holes) to the hole on the main unit, and connect the file hodler and stainless electrode to test wire.

7. Use motor with apex locator function (M5-M9), please insert the test wire (single hole) to the hole on the main unit. Connect the stainless electrode to test wire and hang the stainless strap on the contra angle.

VI Function and settings

i. Mode and Function

Working Mode Table

NO.	Function option					
	Normal	Automatic1	Automatic2	Apex	Slow down	Start/stop
M1	✓	—	—	—	—	—
M2	✓	✓	—	—	—	—
M3	✓	—	✓	—	—	—
M4	—	—	—	✓	—	—
M5	✓	—	—	✓	—	—
M6	✓	✓	—	✓	—	—
M7	✓	✓	—	✓	✓	—
M8	✓	✓	—	✓	—	✓
M9	✓	✓	—	✓	✓	✓

This unit has 9 modes and consists of 6 function options:

NORMAL: Manually motor functions

AUTOMATIC1: automatic reverse1, When the torque goes to the setting value, the file reverses automatically and stops automatically upon withdrawal

AUTOMATIC2: automatic reverse2, When the torque goes to the setting value, the file reverses automatically and starts rotating automatically upon withdrawal

APEX: Apex locator

SLOW DOWN: When the file is approaching to apex, the file automatically slows down for safer treatment

START/STOP: The file starts rotating automatically when inserted into the canal and it stops automatically upon withdrawal

ii. Program settings

Before use, the user should set the speed and torque and save the programs. There are 9 programs can be set by the user.

Setting method:

Notice: The program only can be set in M1、M2、M3 modes (without apex locator function)

- Step1. Press SET button to enter into the setting mode, speed value flashing, then press “ADJUST+” button or “ADJUST-” button to set the speed, speed range: 125、250、375、500、625rpm, press SET button again, speed value stops flashing and it's been saved;
- Step2. when torque value flashing, press “ADJUST+” button or “ADJUST-” button to set the torque value, the torque range: from 6 to 52 mN. m, press SET button, torque value stops flashing and it's been saved;
- Step3. When program number flashing, press “ADJUST+” button or “ADJUST-” button to set program number, press SET button, program number stops flashing and it's been saved, setting is completed.

Notice: It will quit the setting mode after 2S without any press operation, and the numerical value, which had been set, will be lost.

iii. Apex position setting

Dentist can adjust the apex position if necessary. For example you can set the apex position 0.5mm away to the apex hole and unit will memorize this position automatic and endo file will automatic reverse or stop when file reaches this position.

Set method:

Notice: Dentist can set the apex position only in M4 mode (apex locator mode).

Press SET button, apex module flashing, the apex position flash last set position, indicating having been entering into the setting mode, adjust the apex position with pressing “ADJUST+” and “ADJUST-” button, the range within 0.0-1.0. Press SET again to memorize the apex position, the apex module stops flashing, setting completed.

Notice: It will quit the setting mode after 2S without any press operation, and the numerical value has been set will be lost.

VII Use Method

i. Preparation before the use

1. Check each component connection
2. Press **POWER** button, make sure the information displayed in the LCD screen is completed
 - 1) LCD displays last working mode.
 - 2) LCD displays last program.
 - 3) LCD displays apex module in M4 mode
 - 4) Indicating the power of battery quantity, the battery is running when it is charging
3. Press MODE button to select the working mode
4. Press PROGRAM button to select the working program

ii. Operation

Notice: when the instrument is being used, please don't use the adaptor for avoiding the electromagnetic interference.

- M1:** Manual motor function, file will rotate when pressing foot switch and will stop when the torque reaches the setting torque. Release the foot switch, the file stops.
- M2:** Motor with automatic reverse 1 function, press foot switch, file rotates forward, when the torque reaches the setting torque, file reverses automatically, and will stop when the torque is disappeared. Release the foot switch, the file stops.
- M3:** Motor with automatic reverse 2 function, press foot switch, file rotates forward, when the torque reaches the setting torque, file reverses

automatically, and will rotate forward when the torque is disappeared.
Release the foot switch, the file stops.

Notice: when the instrument is in M4–M9, please don't use the adaptor for it cannot get an exact value.

M4: In this mode, only apex locator functions, methods of operation are as follows:

NOTICE: it cannot get an exact value of the apex length when the treatment is in an unstable condition. So, please insert the file into the root-canal and take an X-ray photo to make sure the veracity.

1. The plug of the testing wire should be completely plugged into hole on the main unit.
* When you need to pull out the test wire, please don't pull the wire but hold its pin and pull it out.
2. Clip the metal part of the file with the holder and hang the stainless electrode up at any side of the patient's mouth.
3. Insert the file into the root-canal, and circumrotate the file toward the apex of the root-canal. And then the distance between the tip of the file and the apex of the root-canal will be displayed on the LCD screen. When the figure on the LCD screen shows 0.5mm, please fasten the file with the rubber vernier caliper on the reference point of the tooth crest rather than keep up probing into the root-canal. Then measure the distance from the bottom of rubber vernier caliper to the tip of the file.
* Root-canal length is the file distance when the LCD displays 0.5.
4. Deciding the working length of root canal
When the figure on the LCD screen shows 0.5mm, then measure the distance from the bottom of rubber vernier caliper to the tip of the file. Take note of this figure. So subtract 0.5-1.0mm from the above data is the working length of root-canal.
When the file drills through the root-canal, please make the final value in terms of the one measured in 0.5mm.
The working length of root-canal varies from each other for the reason of different shapes of teeth and root-canal.
5. When the file reaches the position to 2.0mm away from the apex of the root-canal, there will be a continuous alarm.

M5: Apex locator and motor function, press foot switch and the file rotates forward, the file stops working when it reaches the setting apex position.

M6: Apex locator & auto reverse1 motor function, press foot switch the file rotates forward and reverses when it reaches the setting apex position and stops without touching the root canal.

M7: Apex locator & autoreverse1 motor & slowdown function, press foot switch the file rotates forward and automatically slows down when approaching to apex and reverses automatically when it reaches the setting apex position and stops without touching the root canal.

M8: Apex locator & auto reverse1 motor & automatically start and stop function (no need foot switch in the mode). The file starts to rotate forward when it entering into the root canal and reverse when it reaches the setting apex position, and stops without touching the root canal.

M9: Apex locator & auto reverse1 motor & automatically start and stop & slowdown (no need foot switch in the mode). The file starts to rotate forward when it entering into the root canal and automatically slows down when approaching to apex and reverses automatically when it reaches the setting apex position and stops without touching the root canal.

Reverse: Press the REVERSE button, file will reverse and you can change the forward and reverse by press the REVERSE button.

Notice: When the torque reaches or exceeds the setting torque in M5–M9, and no matter the root canal enlarged file reaches the set data or not, the file would stop or reserves automatically.

iii. Power manage

1. Battery power

LCD displays the current battery power, the number of lattice shows more, and the power is fuller. If there is no electricity the lattice will flicker, which means the battery power is about to run out, at this status the beeper will ring per 3S, and unit will shut down after 60S.

2. Battery recharging

To fully recharge the battery, you should connect the unit to adaptor at least for 4 hours or more (The new battery requires at least 8 hours or more), the sign will be running during the battery charging.

Notice: 1. when the instrument is connected to the adaptor, the beeper will beep for three times, showing the connection is correct.

2. when the instruments in M4-M9, please don't charge the battery.

3. Automatic power off

The instrument will shut down automatically when it ceases working for 3 minutes.

In that case, all display and function will stop.

Notice: When power off, the LCD will show recharging sign when charging.

VIII Maintenance and sterilization

1. If not use the unit for long time, please open the battery cover and remove the battery, keep the instrument clean and store it somewhere dry and clean.
2. Parts like contra angle and stainless electrode, which have direct contact with the patient, should be disinfected by autoclave each time after using.
3. The crust of the instrument and the wire should be disinfected by the ethanol.

IX Troubleshooting

If the equipment is not normal work, before call our after-sales center, please check the table below.

Phenomenon	Reason analyses	Problem shooting
Can't power on	Low battery	Recharge the battery
File doesn't run	Bad contact in foot switch	Check the wire and make sure the foot switch works well
	Resistance in root-canal is too much	Increase the torque by manual adjusting the forward/reverse mode

File stops automatically	Resistance in root-canal is too much	Increase the torque by manual adjusting the forward/reverse mode
	Bad condition in root canal (M5)	Change to non-apex locator mode (M1-M3)
Inaccurate apex value	The unit is in unstable condition	Restart and compare with x-ray film
	Bad condition in root canal	Clean the liquid and remnant
	Electromagnetic Interference	Don't use the adaptor for charging
File can't reverse automatically	Not in auto-forward/reverse mode	Select auto-forward/reverse mode
	Preset torque is too much	Decrease the torque
	File has not reached the preset apex (M6-M9)	File will reverse only when the file reach the preset apex location
File can't start (M8,M9)	The file hasn't been into the root canal	The file will start when goes into the root canal
	Root canal is too dry	Infuse some normal saline
	The pin or electrode is in bad contact	Clean or change the pin/electrode
	Oral mucosa is too dry	Partial humidify oral mucosa
Auto start/stop out of control (M8, M9)	Electromagnetic Interference	Don't use the adaptor for charging
		Change to non-apex locator mode (M1-M3)
The file reverses continually	Resistance in root-canal is too much	Increase the torque by manual adjusting the forward/reverse mode
The file reverses continually	Bad condition in root canal (M6-M9)	Clean the liquid and remnant
	The preset apex location is too high (M6-M9)	Change to non-apex locator mode (M1-M3)
		Reset the apex location

The file reverses continually	The opening of root canal is too small(M6-M9)	Enlarge it
	The file is too big (M6-M9)	Change a smaller size
	Electromagnetic Interference	Don' t use the adaptor for charging
The using time of battery is too short	Not fully charged	Charge the battery at least 4 hours
	Battery is aged	Replace the battery

X Services for product and technology

Our company is responsible for product-and-technology service. Our experienced technician will offer you technical support when technical problem occurs.

XI Transportation and storage

Ambient temperature: -5℃~+40℃

Relative humidity range: 10%~93%

Atmospheric pressure: 86Kpa~106Kpa

Equipment is not suitable for storage in the presence of sunlight, rain, dust, and corrosive gasoline and volatile with poor ventilation.

Transportation is available to all common methods.

XII Mark illustration



Class II equipment



Type B equipment



Caution! Please read the instruction

IPX1

Protection against ingress of liquids:drip-proof



CE marked product