

Apex Locator

Be Smart, Be Compact!

Dr's Finder

Smart Apex Locator

Model : AL-DF10

User manual

Eng

CE
0123

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1 Introduction

Thank you for purchasing the device. The instructions described below have been designed to provide the necessary information for the successful operation, daily maintenance and safety for the use of this device.

Features

- Color OLED screen
- Compact size
- Chargeable battery
- W.L.S (Working Length Select) function

Intended Use

The system is to find apex of oral cavity by check difference of impedance between tooth and apex of oral cavity by micro current through file hook and lip hook.

This product is intended Use for patients in dental clinic only. Any other type of use is not permitted.

2 Safety information

It is important to understand the following information to use this product safely.

Symbols



Warning

Indicates a potentially hazardous situation which, if not avoided, may result in serious injury or death.



Caution

Indicates a potentially hazardous situation which, if not avoided, may result in minor/moderate injury or in damage of property

Notes and References

Notes and References used in this manual are shown below.



Note

Indicates that potential malfunctions may occur if the description is ignored.



Reference

Supplementary information to facilitate better operation.

2 Safety information

Installation and Connection



Warning

- The adapter should be disconnected from the device before connecting the power cable to prevent an electric shock.
- Keep away from source of ignition to avoid fire or explosion.
- Protect the device from any liquid to avoid electric shock or functional error.
- Place the device on a flat and stable surface. Do not drop device to avoid internal defect that may cause overheating or fire.
- Do not place the electric cord near a gas burner or sources of heat. Should the cord catch on fire, replace with the new one to avoid short-circuit.



Caution

- Do not use or leave the unit in areas of high temperature or exposed to direct sunlight, internal circuit defect may cause overheat or fire.
- Securely connect the dust-free power plug to the outlet.
- Use this device ventilated areas. Overheating may cause fire.
- Do not touch the terminal areas of device with finger or conductive objects, such as metal wire or safety-pin. It may electric shock or fire.
- Do not use any accessories other then supplied. It may cause fire or device malfunction.
- Make sure the cable, file hook, lip hook, and etc are securely plugged for each and device. A poor connection can prevent measurement.

2 Safety information

Operation



Contraindication

- Do not use this product on a person with a pacemaker as it may cause malfunction of the pacemaker.
- Do not use this unit in the medical operation room.
- This unit must not be connected to or used in combination with any other apparatus or system. It must not be used as an integral component of any other apparatus or system.
- Good Doctors Co., Ltd. will not be responsible for accidents, equipment damage, bodily injury or any other trouble which results from ignoring this contraindication.



Warning

- Do not plug the power cord with wet hands. This may result in an electric shock.
- In case of fluid leak from battery or partial discoloration/deformation of the device, immediately discontinue use.
- Connect the cord to device when charging. Wrong directed placing may cause malfunction, explosion, or fire.
- In case of partial discoloration of device, immediately turn off the device and repair it.
- In case battery fluid contacts the eye, immediately flush with copious amount of clean water and seek medical attention.
- Accurate canal measurement is not always possible depending on the shape and condition of the tooth as well as a decline in the equipment's performance.
- Do not use damaged accessories (file hook, or etc.).
An accurate measurement can not be made with damaged accessories.
- Use rubber dam when endodontic treatment.

2 Safety information

Operation



Warning

- Check the device operation before use. If the OLED screen doesn't show normal condition, the device might have a problem. In this case, stop using and get repair.
- The measured figure on the display does not correspond to any actual distance and should only be used as estimates.
- Never connect this device to any device not approved by manufacturer.
- If the battery power is low, the device function could not be performed. In this case, recharge the battery.
- Some of cases like a blocked canal the measurement figure could be not accurate.
- Checking the measurement with an x-ray is recommended. Due to accuracy is not accurate due to canal shape, unusual case, or device condition.
- Do not use the device if you sense an abnormal situation during measurement.
- Electric noise from other devices like scalers could interfere the measurements. Do not use scalers on measurements.
- Autoclave file hook and lip hook after each patient.
- On charging, it cannot make accurate measurement. Do not use the device on charging.
- Do not use or leave the unit in areas of high temperature or exposed to direct sunlight.



Caution

- Disconnect the power cord by grasping the power plug to avoid injuries or burns.
- Avoid damage or use of unnecessary force on the power cord and device. This may cause an electric shock, fire, or malfunction.
- Should battery fluid contact the skin or clothes, immediately wash it off with copious amounts of water to avoid skin damage.

2 Safety information

- Turn off the device, when don't use it.
- Do not use this product for any purpose other than dental use.
- This device is not water prove. Be careful the device from the wet or liquid.
In case of malfunction due to this case, it is not covered by warranty.
- Federal law restricts this device to sale by or on the order of a dentist (for U.S.A.).
- Do now use this device with other apparatus or system.
It might has problem for this device performance.
Manufacturer does not have responsibility for accident, malfunction or any other trouble due to ignoring this caution.
- Be careful let the file touch the gums. It make measuring figure shows APEX.
- In case of canal is too dry, the device could not measure.
Try moistening the canal with oxydol or saline.
- Lip hook is made by metal. Check the patient has an allergy to metals.
- Be careful when clip the file hook to file to avoid any damage for the file.
- Using file which has metal handle makes electrical leakage, and it makes not accurate measuring figure. Use the file and reamers which has plastic handles only.
- Do not drop the device to avoid malfunction

2 Safety information

Maintenance



Warning

- Use only accessories supplied from manufacturer to avoid fluid leak, explosion, or malfunction.
- Do not disassemble or overhaul the device.
Unusual performance may cause injuries, electric shock, fire, or malfunction.
- Be careful from any liquid when cleaning.

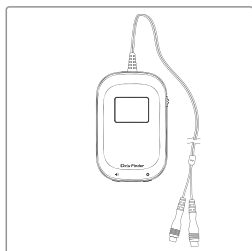


Caution

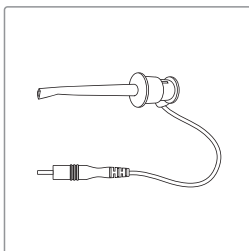
- Do not use solvent (containing orange oil, ethanol or acetone) when clean the device.
- User must be in charge of operation, maintenance and check.
- Do not autoclave the probe cord.

3 List of components

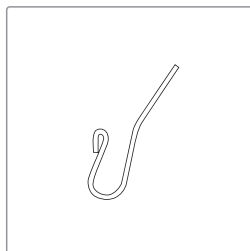
Please check the contents described below when removing the contents from the original packaging.



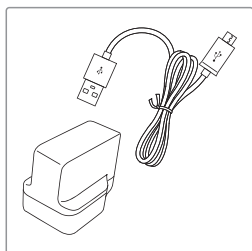
Main body



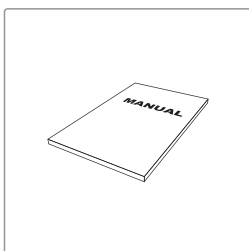
File hook (x2 pcs)



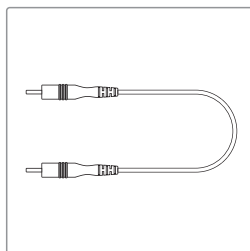
Lip hook (x3 pcs)



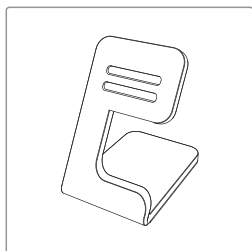
Adapter & cable



User Manual

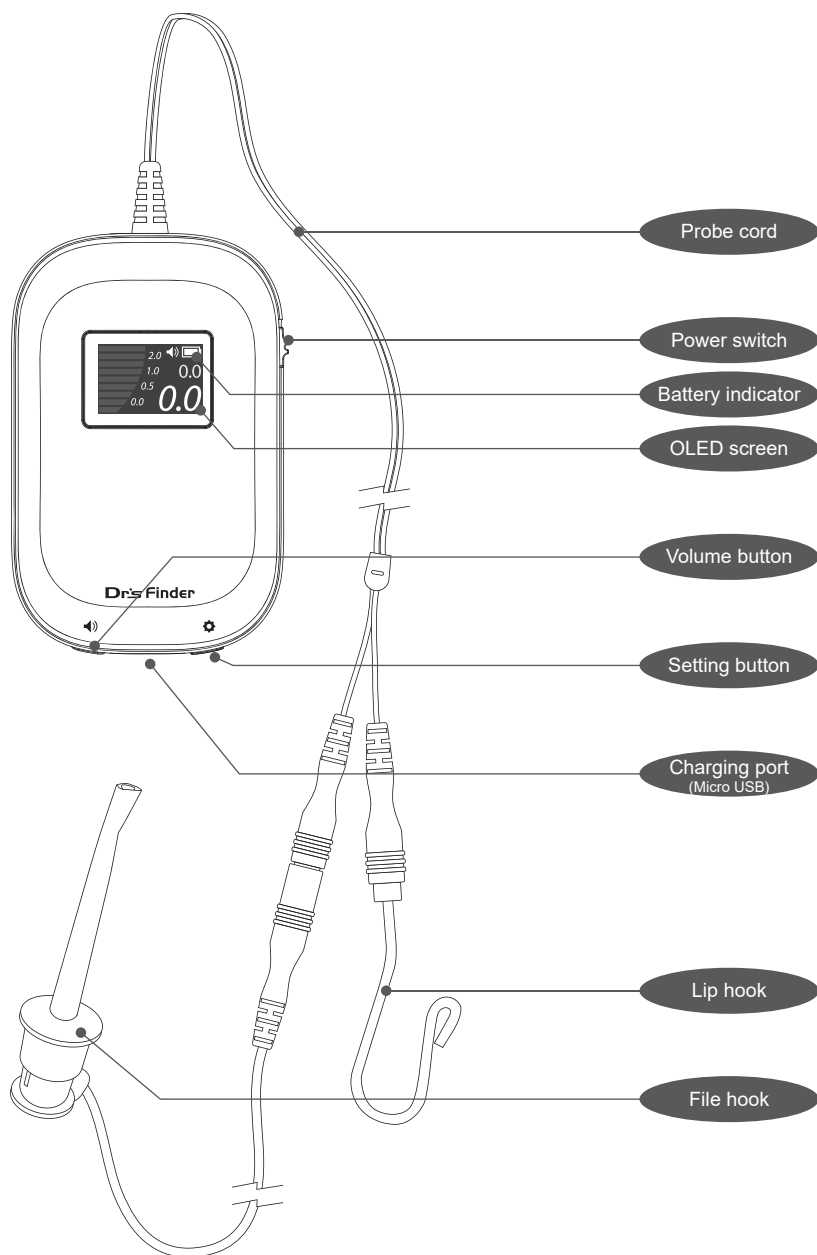


Calibration jig



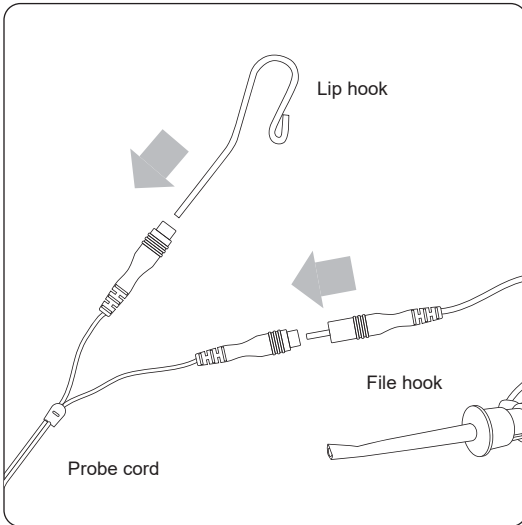
Stand

4 Parts identification



5 Installation

1. Connecting the probe cord



Insert file hook and lip hook into the probe cord.

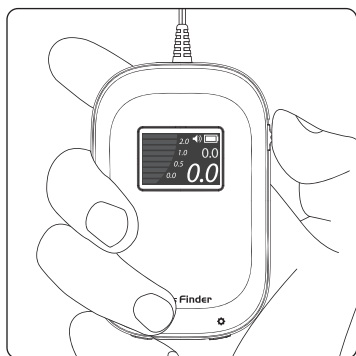


Reference

- It doesn't matter connect the file hook and lip hook any female connector.

5 Installation

2. Checking the function

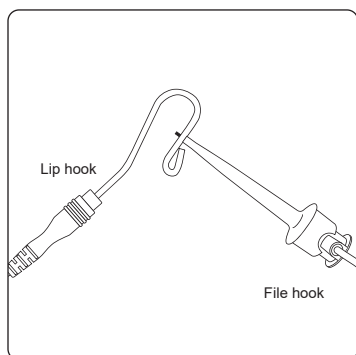


Turn on the power switch. The display will appear on OLED screen with beep sound.



Note

- To save battery, turn off the device when don't use it
- Please check the accuracy of the product using the calibration jig before use. (refer to 24page)



Simple checking method is to connect the metal part of lip hook and file hook. Then device show APEX on the display.

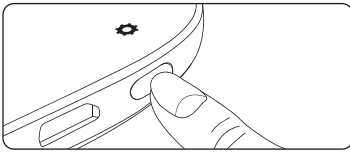


Warning

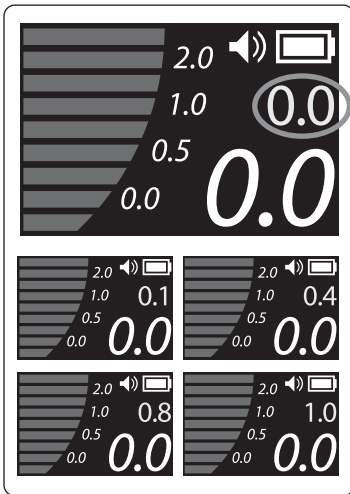
Check the device operation before use.
If the OLED screen doesn't show normal condition, the device might have problem.
In this case, stop using and get repair.

5 Installation

3. W.L.S. setting



Set the W.L.S. by pushing the setting button shortly.

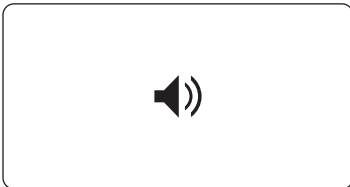


The W.L.S. is shown little number. W.L.S. setting is not changeable even device is turned off.



Reference

- Can adjust the number from 0.0 ~ 1.0.
- The W.L.S. is can not be set beyond the Apex.
- The W.L.S. is memorized even the device is turn off.



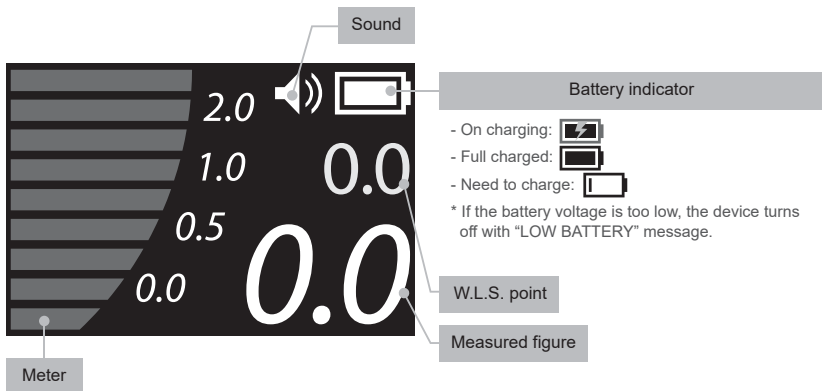
- The beep cycle is shorter as the file is closed for W.L.S.
- Initial W.L.S. is 0.0 (Apex)
- * The measured figure is on W.L.S. the beep sound cycle is every 0.2 sec. If it is beyond of W.L.S. make Bee~~ sound.

6 How to use



Never connect the device to any device not approved by manufacturer.

1. Operation display and buttons



The meter reading does not correspond to any actual distance and should only be used as estimates.



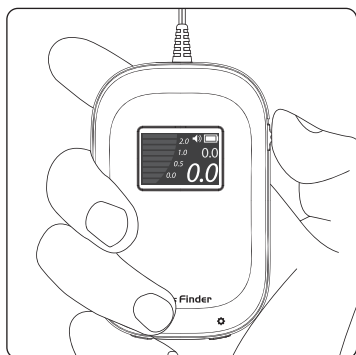
Sound button

Setting button

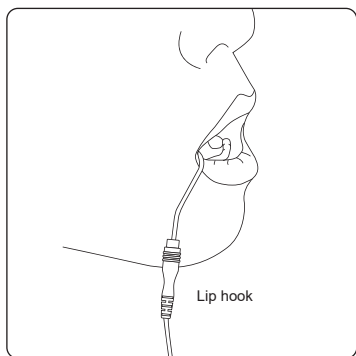
Short click : W.L.S. point change from 0.1 to 1.0.

6 How to use

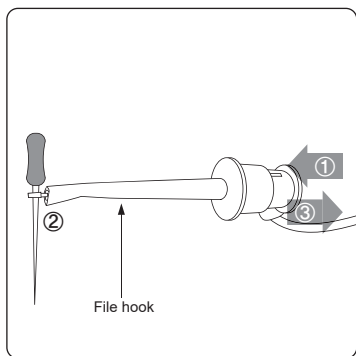
2. Operation



1) Turn the device on.



2) Hang the lip hook in the corner of the patient's mouth.



3) Clip the file hook to the file.

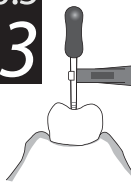
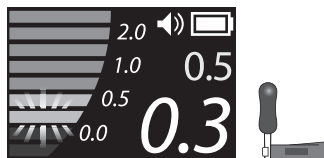
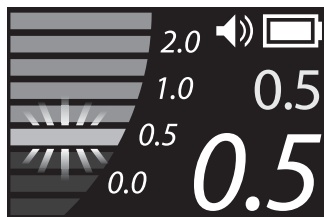
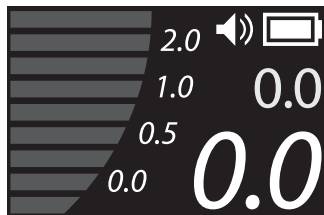
- ① Press the direction of arrow
- ② Clip the file
- ③ Release the press

6 How to use

4) Determine the working length.

- The beep sound is changed as measured figure.

* The working length will differ somewhat depending on each individual tooth. This discrepancy must be judged by the dentist as he works on the tooth.



Note

Make sure to take x-ray to check the results.



Reference

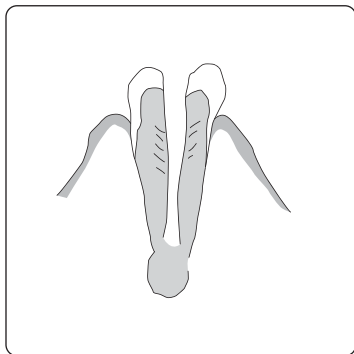
The beep sound is changed as measured figure.

6 How to use

3. Root canals not suitable for electronic measurement

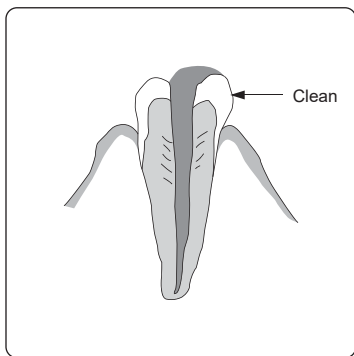
Accurate measurement cannot be obtained with the root canal conditions shown below.

There may be cases other than these where an accurate measurement cannot be made.



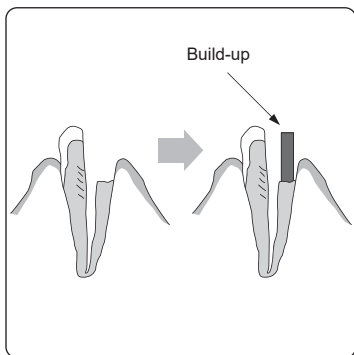
Root canal with a large apical foramen

Root canal that has an exceptionally large apical foramen due to a lesion or incomplete development cannot be accurately measured; the results will show shorter measurement than the actual length.



Root canal with blood, saliva or a chemical solution overflowing from the opening

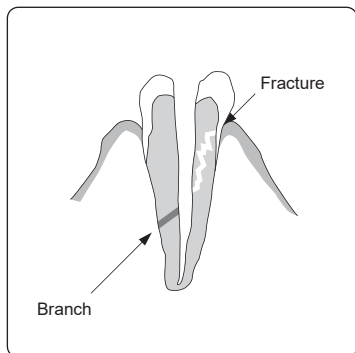
If blood, saliva, or a chemical solution overflows from the opening of the root canal and contacts the gums, this will result in electrical leakage and an accurate measurement cannot be obtained. Wait for bleeding to stop completely. Clean the inside and opening of the canal thoroughly to get rid of all blood, saliva and chemical solutions and then make a measurement.



Broken crown

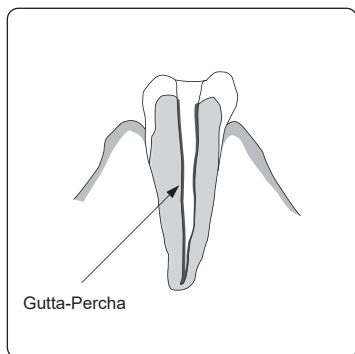
If the crown is broken and a section of the gingival tissue intrudes into the cavity surrounding the canal opening, contact between the gingival tissue and the file will result in electrical leakage and an accurate measurement cannot be obtained. In this case, build up the tooth with a suitable material to insulate the gingival tissue.

6 How to use



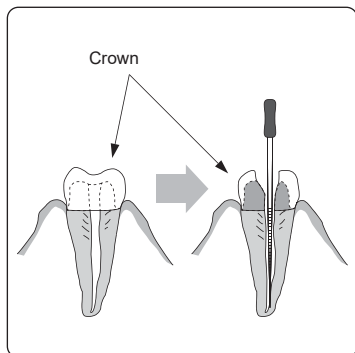
Fractured tooth **Leakage through a branch canal**

Fractured tooth will cause electrical leakage and an accurate measurement cannot be obtained. A branch canal will also cause electrical leakage.



Re-treatment of a root filled with gutta-percha

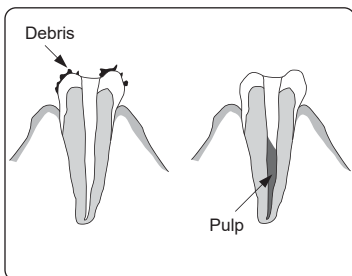
The gutta-percha must be completely removed to eliminate its insulating effect. After removing the gutta-percha, pass a small file all the way through the apical foramen and then put a little saline in the canal, but do not let it overflow the canal opening.



Crown or metal prosthesis touching gingival tissue

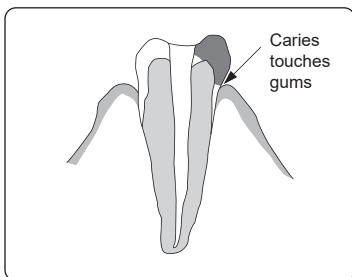
Accurate measurement cannot be obtained if the file touches a metal prosthesis that is touching gingival tissue. In this case, widen the opening at the top of the crown so that the file will not touch the metal prosthesis before taking a measurement.

6 How to use



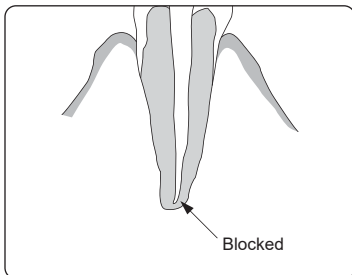
Cutting debris on tooth Pulp inside canal

Thoroughly remove all cutting debris on the tooth.
Thoroughly remove all the pulp inside the canal;
otherwise an accurate measurement cannot be made.



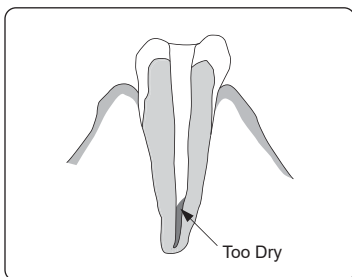
Caries touching the gums

In this case, electrical leakage through the caries infected area to the gums will make it impossible to obtain an accurate measurement.



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.



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.

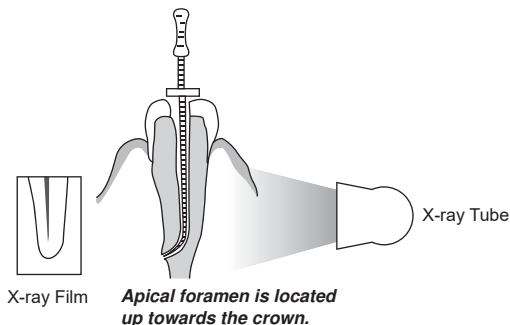
6 How to use

4. Reading and radiography

Sometimes the device meter reading and the x-ray image will not correspond. This does not mean that device is not working properly or that the x-ray exposure is failure.

* Occasionally, the actual apical foramen does not correspond exactly.

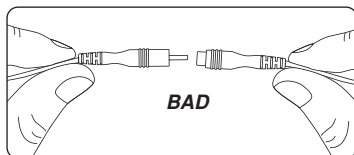
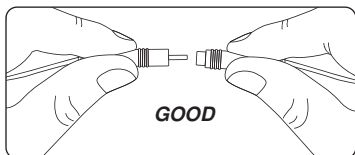
The actual apical foramen may be located up towards the crown. In these case, the x-ray image will seem to indicate that the file has not reached the apex.



* Depending on the angle of penetration of the x-ray beam, the apex may not appear correctly, and the position of the apical foramen may appear to be located differently than it actually is.

5. After using the device

- 1) Turn the device off
- 2) Disconnect the probe cord and other cords or cables.



Note

- Do not pull directly on the cords when connecting or disconnecting the probe and file hook.
Always grip the connectors to connect and disconnect cords.

- Do not wrap the probe cord around the body of the main unit.

6. Charging

Connect charging cable (micro USB) to device. And connect the charging cable.



Reference

- Charging time is around 1~1.5 hours.

- Can use the electric power source USB port from or 5V AC adapter.



Warning

AC adapter for charging should be 5V. If use other voltage adapter, the device could get malfunction.

Sterilization

1. Autoclaveable components

- File hook
- Lip hook

Recommended temperature and time: 121 °C, 20 minutes minimum with a sterilization pouch.

Minimum drying time after sterilization: 10 minutes



Warning

Autoclave file hook and lip hook after each patient.



Note

- Do not sterilize in any way other than autoclave.
- The file hook and lip hook must be thoroughly washed and cleaned before autoclaving.
- Any chemical or foreign debris left on instruments could cause them to malfunction or could cause discoloration.
- User sterilization pouch when do autoclave sterilization.
- Do not autoclave probe cord.
- Follow the manufacturer's recommendations to disinfect files.

2. Disinfect surface of main unit and probe cord

- Clean the device gently with a clean, soft, lint-free cloth.
- Do not use solvents or any liquid when clean the device. The device is not waterproof.
- Do not use sharp or pointed tool to clean, as they may damage or scratch the device.
- Remove restorative material gently with plastic spatula. Avoid using sharp tools to clean the main unit.



Warning

- In case change battery, please contact local dealer or Good Doctors.

8 Trouble shooting

If the device does not work normally, please refer to the following points.

Problem	Check points	Response
No power	Check the battery power	Charge the battery
Cannot make a measurement.	Check cord connection. Check probe cord, file hook for broken wire.	Check the connection condition. Touch the lip hook and file hook, and check the device display show Apex.
No sound.	Check if sound is turned off	Turn the sound on by volume button.
Cannot W.L.S.	Does the button work?	Switch may be broken.
Display does not appear.	Check the battery power.	If it is not battery power problem, the OLED may be malfunctioning.
Measured figure is unstable.	Check the lip hook is contacted with oral mucosa. Check file hook dirty.	Make sure the lip hook makes good contact with the oral mucosa. Clean the file hook.
Measuring figure reaction is to sensitive. (Too shorty, poor accuracy)	Overflow from the opening of the crown by blood or saliva. There are filled with blood, saliva or chemical solution. Tooth surface covered by cutting debris or chemical solution. File is touch the gingival tissue. Pulp tissue left inside the root canal.	Blood or other fluids overflow the canal make current leakage. Clean the canal, canal opening and tooth crown. The meter bar could move suddenly, but it will return to normal as file is closed to the apex. Clean the tooth surface. Detach the file from gingival tissue. In case large amount pulp tissue is left inside the root canal, measured figure could not accurate. Remove the pulp.

8 Trouble shooting

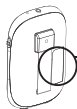
	<p>Check the metal part of file touches prosthesis.</p> <p>Check the crown is broken.</p> <p>Check the file hook is broken or dirty.</p>	<p>Detach the metal part of the file from prosthesis.</p> <p>To stop electric leakage, build up an insulating barrier.</p> <p>Replace or clean the file hook.</p>
<p>Measured figure is moved only file tip is close to apical foramen.</p>	<p>Check the canal is blocked.</p> <p>Check the apical foramen is very large and open.</p> <p>Check the canal is very dry.</p>	<p>Open the canal, and measure it.</p> <p>Very large apical foramen could make non-conductive situation.</p> <p>Make moisture to the canal with oxydol or saline solution.</p>

* If the user is unable to inspect the device himself or if the device fails to work properly after being adjusted or after parts are replaced, contact local dealer or manufacturer.



Reference

- How to check the serial number.



S/N : DF 01200211

8 Trouble shooting

* Accuracy check

- Connect the calibration jig on the probe cord. And turn on the device.
- Check the measured figure shows 2.8.

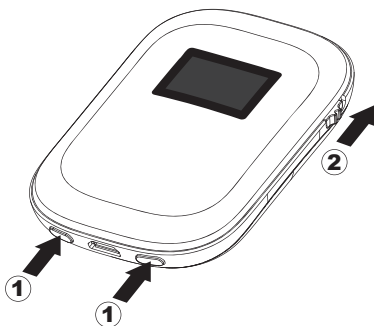


Note

If the figure is not 2.8. Need to calibrate.

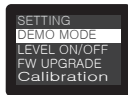
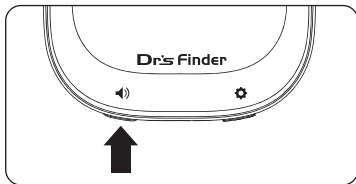
* Calibration

- If the figure doesn't show 2.8 from the accurate check, need to calibrate as follow step:
 - i) Click sound button and setting button both and hold. And turn on the device with power switch. Then the device will be turn to factory mode.

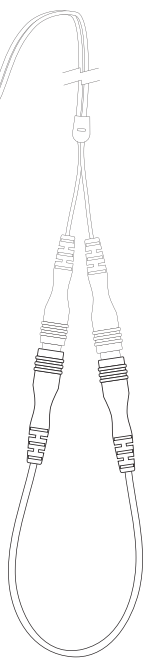
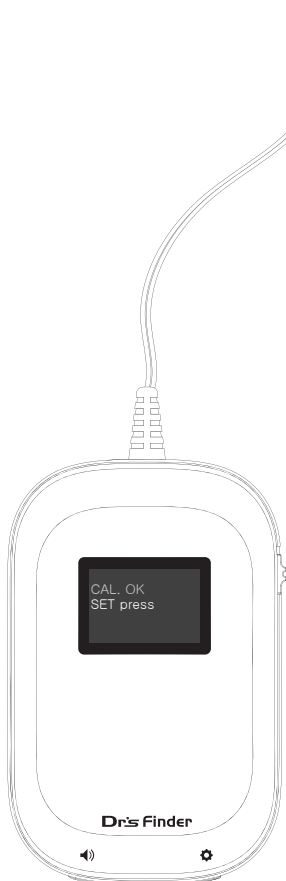


8 Trouble shooting

- ii) Connect calibration jig on the probe jack.
- iii) Select calibrate with sound button, and click setting button.



- iv) Wait till "CAL. OK" message. And if "CAL. Ok" message is shown, calibration is done.




Note



If "CAL. Fail" message is shown, try calibration again.

9 Specification

Equipment Class

Model:	AL-DF10
Trade name:	Dr's Finder
Power supply:	3.7V Lithium-polymer
Safety:	IEC60601-1
EMC (Electro-Magnetic Compliance):	IEC60601-2
Protection from electric shock:	Type BF 
Protection from ingress of liquids:	IPX0 (ordinary equipment)
Electrical rating:	5V d.c., 1A
Power consumption:	0.29W
Measuring voltage:	0.2V
Measuring current:	Max 30 μ A
Charge power:	DC 5V, 0.5A

Operation, transport, and storage condition for the main unit

	Operation	Storage	Transport
Temperature	10~30°C	10~40°C	-10C~50°C
Humidity	10~80%	20~80%	20~80%
Atmospheric pressure	800 ~ 1360 hPa		

Additional Information

Main unit	Length / Weight	Approx. 55 x 85 x 21 mm / Approx. 56 g
File hook	Length	Approx. 200 mm (included hook tip)
Lip hook	Length	Approx. 65 mm
Probe cord	Length	Approx. 1.3 M
AC adapter	Spec	5V 2A
Battery	Life time	5 Years
Main unit	Life time	10 Years (It may vary depending on the user's management status)

Symbol



This device conforms with the European Directive, 93 / 42 / EEC which includes the requirements for electromagnetic compatibility



This symbol is appixed to fulfill the requirements of EU Directive 2012/19/EU Article 11. This equipment cannot be disposed of as unsorted municipal waste within the European Union. Follow local regulations for disposal.









SN

Serial number
 00 00 00 0000
 Model / Month / Year / Serial



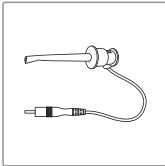
Attention,
 consult accompanying documents.

9 Specification

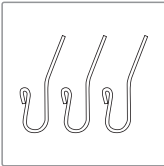
	Type BF applied part (File hook, Lip hook)		Manufacturer
	Prevent by wet.		This box is paper recyclable.
	Do not device on place where get direct sunshine.		Fragile item
	Transport temperature.		No hooks

EC REP Authorized representative in the European Community

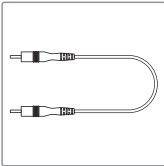
10 Accessories



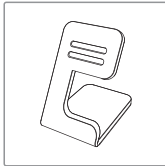
File hook



Lip hook



Calibration jig



Stand

11 Warranty

This product is only shipped after strict inspection. Should the product incur any problems under normal use conditions within on year form the date of purchase, the repair will be free of charge. However, repair of accessories (File hook, Lip hook, Probe cord, batteries, or transportation costs) are not covered by the warranty. For more information refer to the 12. Warranty card.

EC REP **Good Doctors Germany GmbH**

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