

Be Smart, Be Compact!

# Dr's Finder NEO

New Concept of Apex Locator

Model : AL-DFA20

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, maintenance and safety for the use of this device.

## Features

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- Touch color screen
- Smallest size
- Rechargeable battery
- Working length select

## Intended use

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- This unit can be used to detect the apex of root canal.
- 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.

### Warning and caution

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Warning and caution used in this manual are shown below.



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

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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

- 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 cause electric shock or fire.
- Do not use any accessories other than supplied. It may cause fire or device malfunction.
- Make sure the cables, file hook, lip hook, and etc are securely plugged for each and device. A poor connection can prevent measurement.

## 2 Safety information

### Operation



#### Warning

- Do not plug the charging cable 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.
- Do not use this product on a person with a pacemaker as it may cause malfunction of the pacemaker.
- 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, probe cord, or etc.).  
An accurate measurement can not be made with damaged accessories.
- A rubber dam should be used when performing endodontic treatment.
- Check the device operation before each patient. If the indicators in the display do not all appear normally, the device may not be able to make an accurate measurement. In this case, stop using the instrument and have it repaired.
- 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.
- In some case such as a blocked canal, a measurement cannot be made.
- Always check the measurement with an x-ray.  
In some cases, an accurate measurement cannot be made because of the canal shape, unusual cases, or poor performance of the device.

## 2 Safety information

### Operation



#### Warning

- Stop using the instrument immediately if you sense something odd or abnormal while taking a measurement.
- Do not use the device ultrasonic scaler with the lip hook attached to the patient. Electric noise from the scaler could interfere with canal measurements.
- Do not grip by hand the device. Electric noise from human could interfere with canal measurements.
- Autoclave file hook and lip hook after each patient.



#### Caution

- 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 amount water to avoid skin damage.
- 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.).
- Blocked canals cannot be accurately measured.
- This device 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. Manufacturer will not be responsible for accident, equipment damage, bodily injury or any other trouble which results from ignoring this caution.

## 2 Safety information

- Illumination devices such as fluorescent lights and the Film viewer which use an inverter can cause the device to operate erratically.  
Do not use the device near devices such as these.
- Electromagnetic wave interference could cause this device to operate in an abnormal, random and possibly dangerous manner.  
Cellular phone, transceivers, remote controls and all other devices which transmit electromagnetic waves located inside the building should be turned off.
- Do not let the file touch the gums. This will cause the meter to jump to Apex.
- If the canal is extremely dry, the meter may not move until it is quite close to the apex.  
If the meter does not move, try moistening the canal with oxydol or saline.
- Occasionally the meter will make a sudden and large movement as soon as the file is inserted into the root canal, but it will return to normal as the file is advanced down towards the apex.
- The lip hook could cause an adverse reaction if the patient has an allergy to metals.  
Ask the patient about this before using the lip hook.
- Take care that medicinal solutions such as formalin cresol or sodium hypochlorite do not get on the file hook or the lip hook. These could cause an adverse reaction such as inflammation.
- Always clip the file hook to the upper part of file shaft, near the handle.  
The metal and plastic part of the file hook can be damaged if they are attached to the file's cutting part or the transition to the cutting part.
- Use files and reamers with plastic handles only.  
If the file has a metal handle, electrical leakage will occur when the handle is touched by fingers and it will prevent an accurate root canal measurement. Even if the file handle is made of plastic, make sure not to touch the metal part of the file with finger.



## 2 Safety information

### Maintenance

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#### 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.

## 2 Safety information

### Clinical caution



#### Caution

- 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 will show shorter measurement than the actual length.
- 2) 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.
- 3) 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.
- 4) 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.
- 5) 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.
- 6) 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.
- 7) 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.
- 8) 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.

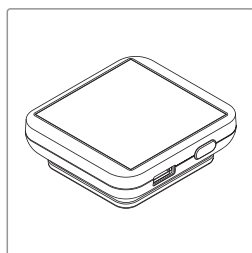
## 2 Safety information

9) 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.

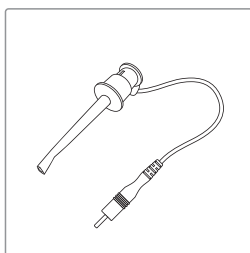
10) Extremely dry canal: If the canal is extremely dry, the meter may not move until it is quite close to the apex. In this case, try moistening the canal with oxydol or saline.

### 3 List of components

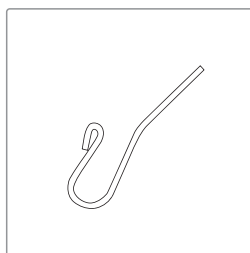
Please check the contents described below when removing the contents from the original packaging.



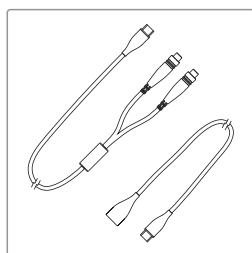
Main body



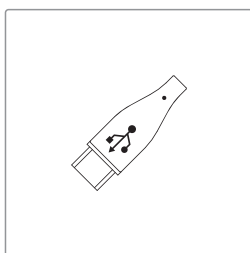
File hook (x 2 ea)



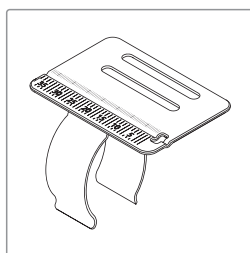
Lip hook (x 3 ea)



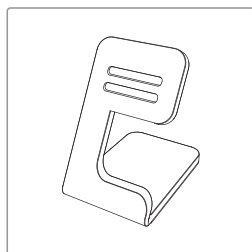
Probe cord & extension cord



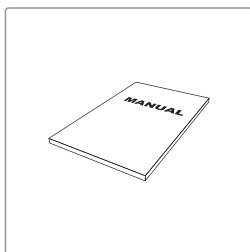
Calibration jig



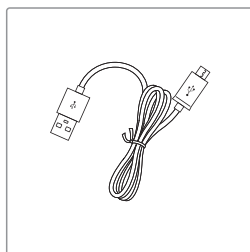
Ruler (x 2 ea)



Stand



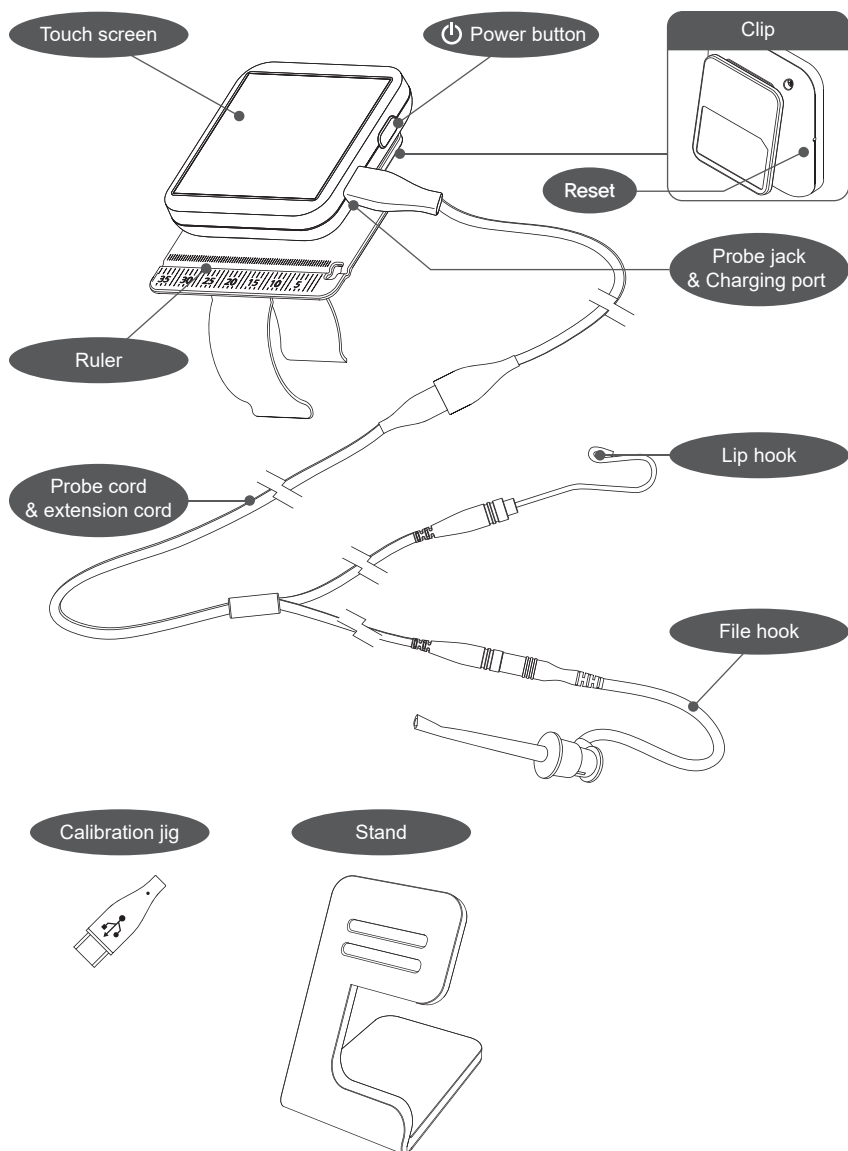
User Manual



Charging cable

\* The file hook and lip hook delivered without sterilized condition.  
Sterilize the file hook and lip hook before use it.

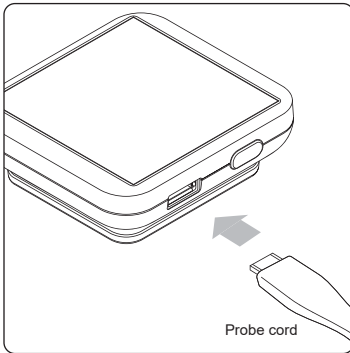
## 4 Parts identification



Power on/off

## 5 Installation

### 1. Connecting the probe cord



Insert the probe cord completely into the probe jack on the upper side of device carefully.



Note

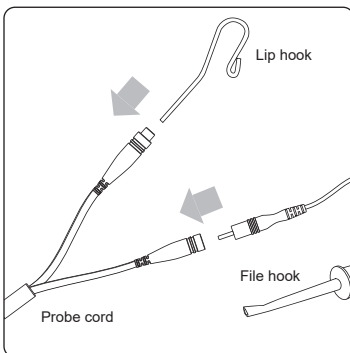
- Make sure the probe cord plug is securely plugged into the probe jack. A poor connection can prevent measurement.

- Do not drop anything on or bang the probe cord plug after it has been inserted into the probe jack.



Warning

The probe cord should be connected as shown above and should not be connected anywhere else.



Insert file hook and lip hook into the probe cord.

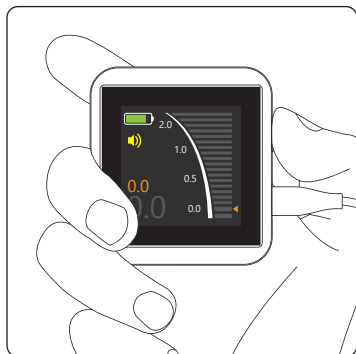


Reference

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

## 5 Installation

### 2. Checking the function

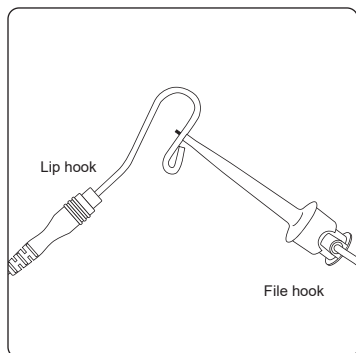


Click power button. The display will appear on screen with beep sound.



Note

The device turns off after 3 minute without use.



Check that the probe cord is properly plugged in the jack. And check that the file hook and lip hook are properly connected to the probe cord. Then Touch metal part of the file hook with the lip hook. Check that all the meter bars on the display light up.



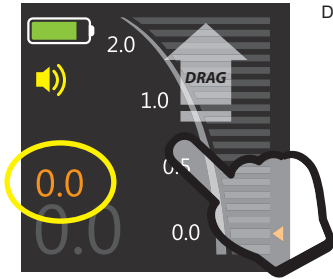
Warning

Check the device operation before each patient. If the indicators in the display do not all appear normally, the device may not be able to make an accurate measurement. In this case, stop using the instrument and have it repaired.

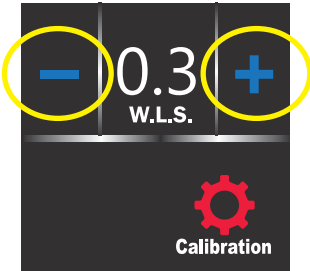
## 5 Installation

### 3. Working length setting

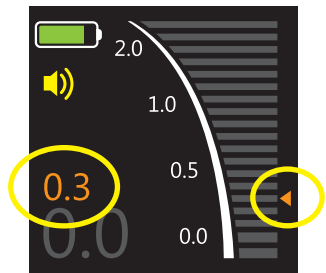
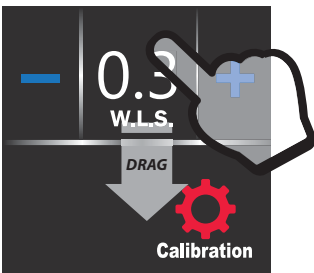
Set the working length on the setting mode.



Drag the screen on upper side to go setting mode.



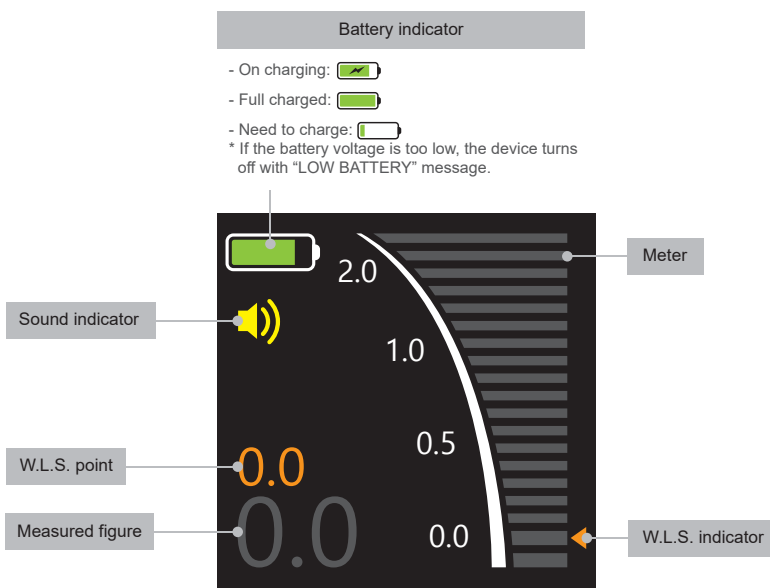
Adjust working length by click + or - icon





# 6 How to use

## 1. Operation display and buttons



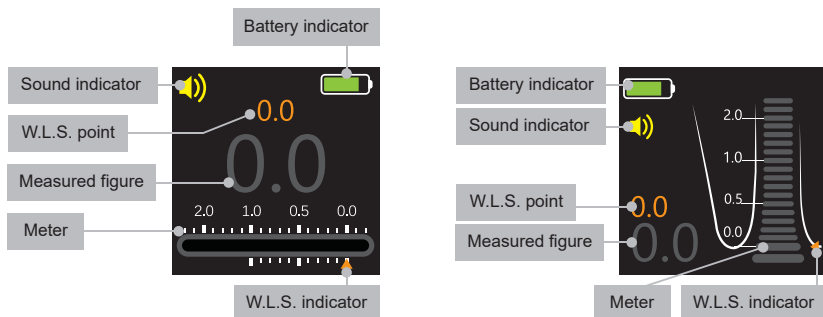
Warning

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



Reference

Can change the display style by drag left or right.

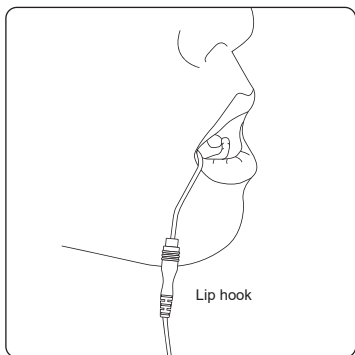


## 6 How to use

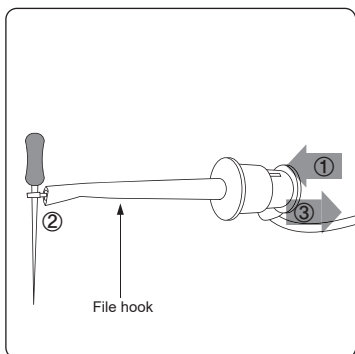
### 2. Operation



1) Turn the device on.



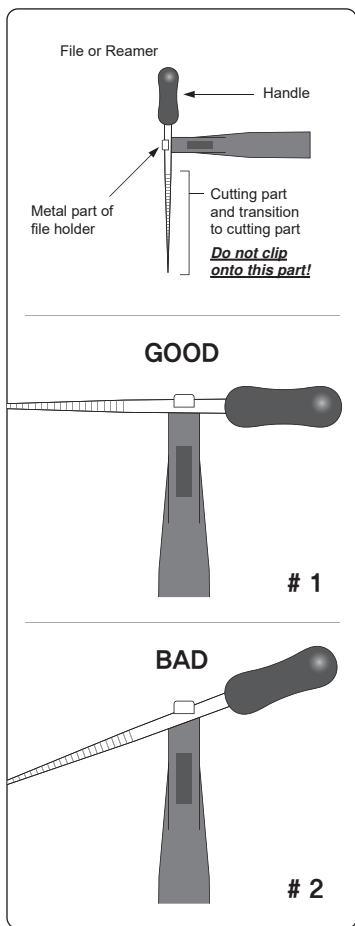
2) Hook the lip hook in the corner of the patient's mouth.



3) Clip the file hook to the metal shaft of the file.

- ① Press in direction of arrow with the thumb.
- ② Clip the file
- ③ Release thumb.

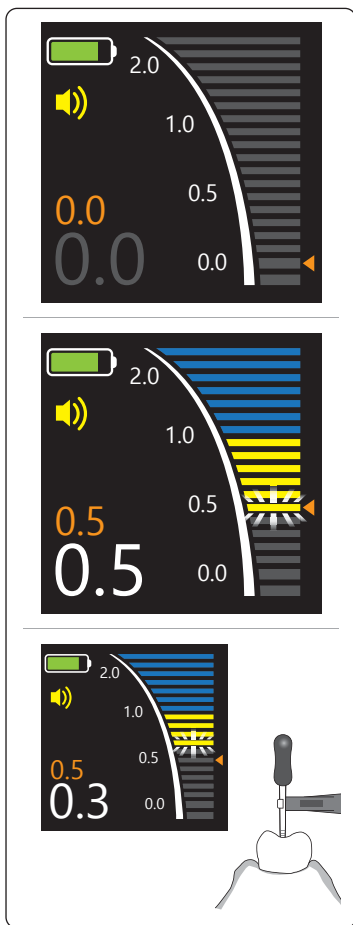
## 6 How to use



Warning

- Always clip the file hook to the upper part of file shaft, near the handle. The metal and plastic part of the file hook can be damaged if they are attached to the file's cutting part or the transition to the cutting part.
- Use files and reamers with plastic handles only. If the file has a metal handle, electrical leakage will occur when the handle is touched by fingers and it will prevent an accurate root canal measurement. Even if the file handle is made of plastic, make sure not to touch the metal part of the file with finger.
- Do not use damaged file hook. An accurate measurement can not be made with a damaged file hook.
- Clip the file as shown in illustration #1 to the left, if the file is in the position shown in illustration #2, it may not make a correct measurement and the file hook could be damaged.

## 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.



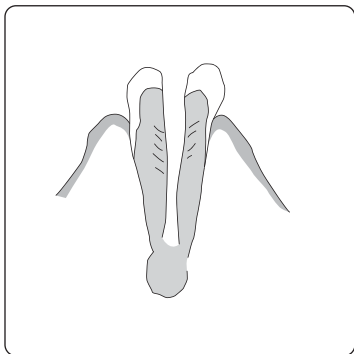
Reference

The beep sound is changed as measured figure.

## 6 How to use

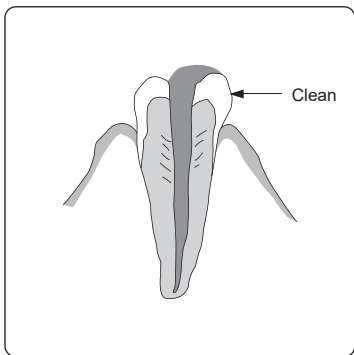
### 3. Root canals not suitable for electronic measurement

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.



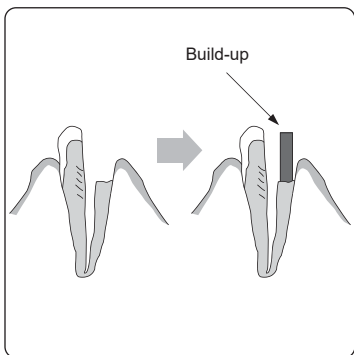
#### **Root canal with a large apical foramen**

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**

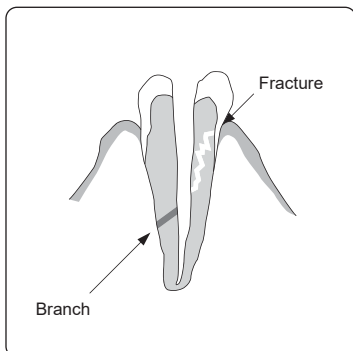
If blood, saliva, or a chemical solution overflows from the opening of the root canal and contacts the gums, this will result in electrical leakage and an accurate measurement cannot be obtained. Wait for bleeding to stop completely. Clean the inside and opening of the canal thoroughly to get rid of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



#### **Broken crown**

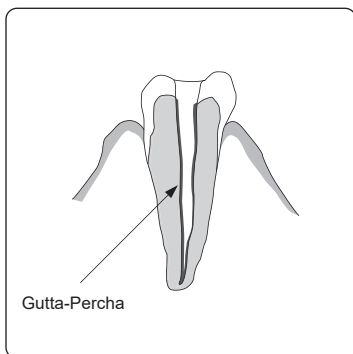
If the crown is broken and a section of the gingival tissue intrudes into the cavity surrounding the canal opening, contact between the gingival tissue and the file will result in electrical leakage and an accurate measurement cannot be obtained. In this case, build up the tooth with a suitable material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

## 6 How to use



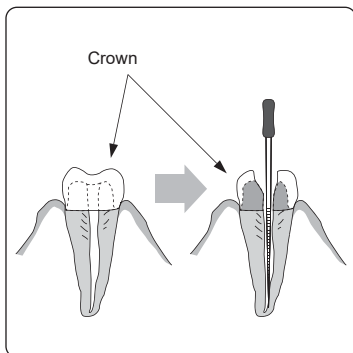
### **Fractured tooth Leakage through a branch canal**

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**

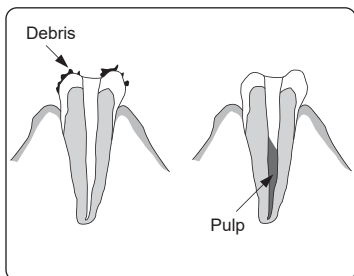
The gutta-percha must be completely removed to eliminate its insulating effect. After removing the gutta-percha, pass a small file all the way through the apical foramen and then put a little saline in the canal, but do not let it overflow the canal opening.



### **Crown or metal prosthesis touching gingival tissue**

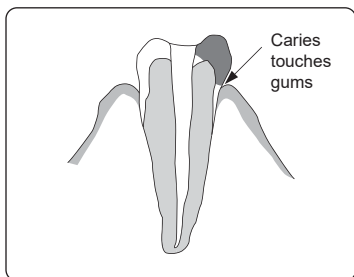
Accurate measurement cannot be obtained if the file touches a metal prosthesis that is touching gingival tissue. In this case, widen the opening at the top of the crown so that the file will not touch the metal prosthesis before taking a measurement.

## 6 How to use



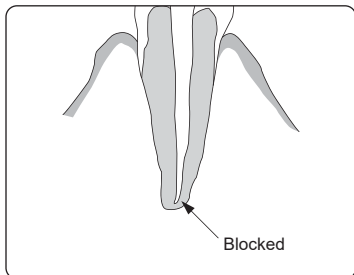
### Cutting debris on tooth Pulp inside canal

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



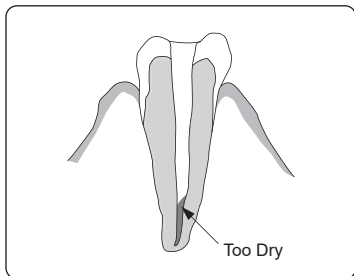
### Caries touching the gums

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.

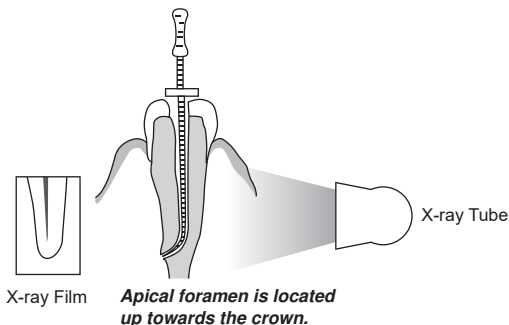
## 6 How to use

### 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.

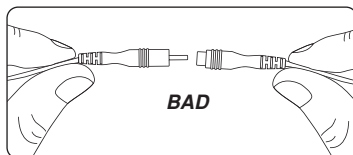
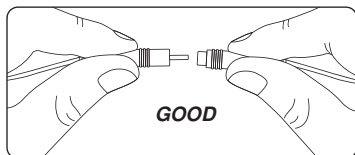
The actual apical foramen may be located up towards the crown. In these case, the x-ray image will seem to indicate that the file has not reached the apex.



\* 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.



## 6 How to use

### 7. Turn off

Click the power button for 2 seconds, then the device will be turned off.



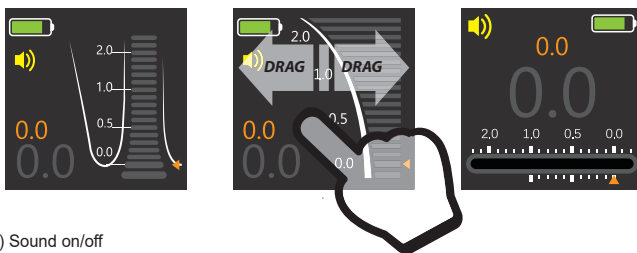
Reference

If the device is not working for 1 minutes, the device will be turned off to save electric power.

### 8. Functions

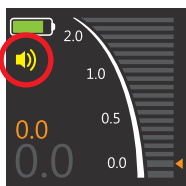
#### 1) Display style

There are 3 display style. Drag by finger to left or right.

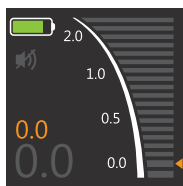


#### 2) Sound on/off

Click the sound indicator by finger.



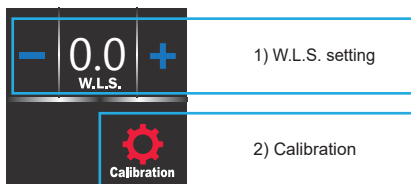
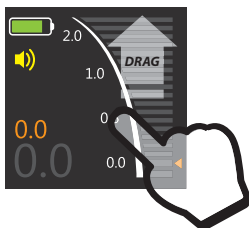
Sound on



Sound off

### 9. Setting mode

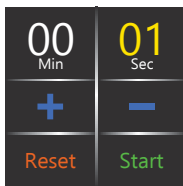
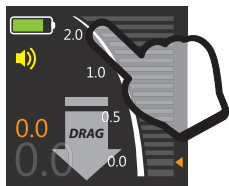
Drag the display from bottom to up as follow image by finger. To back drag the display to up again.



## 6 How to use

### 10. Timer mode

Drag the display from up to bottom as follow image by finger. To back drag the display to up again.



Click Min. or Sec.  
Then adjust the time  
by click +, - icon.

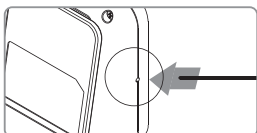


Reference

Click and hold the + or - icon, then the figure change speed will be increased.

### 11. Reset

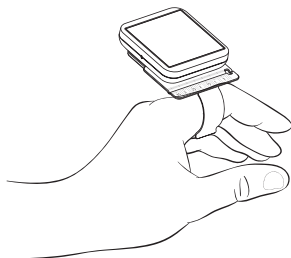
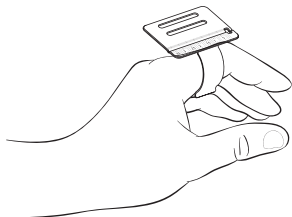
- If the device doesn't work normally, reset the device. Then the device will be reboot.



### 12. Accessory

#### 1) Ruler

Included ruler can be used as follow



## 6 How to use

### 2) Calibration jig

#### \* Accuracy check

- Connect the calibration jig on the probe jack. And turn on the device.
- Check the measured figure shows 2.9.



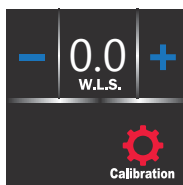
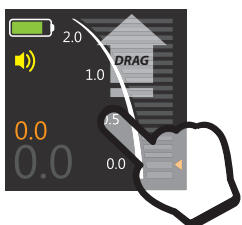
Note

If the figure is not 2.9. Need to calibrate.

#### \* Calibration

- If the figure doesn't show 2.9 from the accurate check, need to calibrate as follow step:

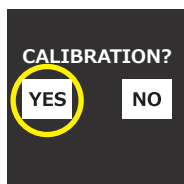
i) Drag the display from bottom to up as follow image by finger. To back drag the display to up again.



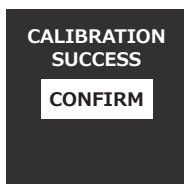
ii) Connect the calibration jig and click Calibration icon.



iii) click "YES" button.



iv) Wait till "CALIBRATION SUCCESS" message.  
And if "CALIBRATION SUCCESS" message is shown,  
calibration is done.



Note



If "CALIBRATION SUCCESS FAIL" message is shown, try calibration again.

## 7 Maintenance

### Cleaning, Disinfecting and Sterilization Method for Components

---

#### 1. File Hook & Lip Hook

Clean and Sterilize File Hook and Lip Hook between each use.

##### Cleaning Method

- 1) Rinse soiled device under running cold tap water for at least 2 minutes. Remove gross soil using a soft-bristle brush or clean, soft, lint-free cloth.
- 2) Immerse the device and soak for a minimum of five (5) minutes in enzymatic detergent solution. Please refer to the enzymatic cleaner or the detergent manufacturer's instructions for preparation and use.
- 3) Use a soft-bristled brush to gently scrub the device until all visible soil is removed.
- 4) Remove the device from the detergent solution and rinse in tap water for at least 3 minutes.
- 5) Perform final rinse using freshly prepared distilled water for at least 2 minutes.
- 6) 8) Check instruments for visible soil. Repeat cleaning if soil is visible.

##### Sterilization Method

Sterilizer type	Steam (Gravity)
Configuration	Wrapped
Temperature	121 °C
Exposure Time	20 minutes
Dry Time	10 minutes

#### 2. Probe Cord and Main Unit

Clean and disinfect Probe Cord between each use.

##### Cleaning Method

- 1) Clean the device gently with a 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.
- 2) Remove soil gently with plastic spatula.

##### Disinfection Method

- 1) Wipe the cord with 70% Isopropyl Alcohol Wipes. Squeeze excessive liquid prior to wiping.
- 2) Air dry the cord, and unit completely before next use.

## 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.  Device check	Check that all connections are properly secured.  Touch the lip hook to the file hook to check probe cord conductivity.  Test with calibration jig.
No sound.	Check sound is off	Turn the sound on.
Can not set W.L.S.	Check the setting	Set the W.L.S. on the setting mode.
Display does not appear.	Check the battery power.	If it is not battery power problem, the screen may be malfunctioning.
Measured figure is unstable.	Is lip hook making good contact with oral mucosa?  Is the file hook dirty?	Make sure the lip hook makes good contact with the oral mucosa.  Clean the file hook.
Measured figure overreacts or is too sensitive. (Measurements are too short. Poor accuracy. Erratic results.)	Is blood or saliva overflowing from the opening of the crown?  Is the canal filled with blood, saliva or chemical solutions?  Is the tooth surface covered with cutting debris or chemical solutions?  Is the file touching the gingival tissue?	If blood or other fluids overflow the canal, the current will leak to the gums and the meter will jump to apex. Clean the canal, canal opening and tooth crown thoroughly.  The meter bar may suddenly swing when it breaks the surface of fluids inside the canal, but it will return to normal as the file is advanced down toward the apex.  Clean entire tooth surface.  This will cause the meter bar to suddenly jump all the way to the "APEX".

## 8 Trouble shooting

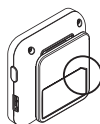
	<p>Is there pulp tissue left inside the root canal?</p> <p>Is the file touching a metal prosthesis?</p> <p>Are proximal surfaces infected with caries?</p> <p>Are there lateral canals or is the tooth fractured?</p> <p>Does a broken crown allow leakage of electric current?</p> <p>Is there lesion at the apex?</p> <p>Is the file hook broken or dirty?</p>	<p>Accurate measurements cannot be obtained if a large amount of pulp tissue is left inside the root canal.</p> <p>Touching a metal prosthesis with the file allows a flow of current to gingival tissue or periodontal pocket and will cause the meter to jump to the "APEX".</p> <p>Current can flow through the caries infected area to the gums and prevent accurate measurement from being made.</p> <p>The meter bar may jump to "APEX" when it reaches the opening of a lateral canal of the opening of a fractured tooth that allows the current to flow to the gingival tissue.</p> <p>Build up an insulating barrier to stop the leakage.</p> <p>A lesion can destroy the apical foramen through absorption and an accurate measurement cannot be obtained.</p> <p>Replace or clean the file hook.</p>
<p>Measured figure does not move at all or only when the file tip is close to the apical foramen.</p>	<p>Is the canal blocked?</p> <p>Is the apical foramen very large and open?</p> <p>Is the canal extremely dry?</p>	<p>Open the passage all the way through the apical constriction first and then take the measurement.</p> <p>If the apical foramen is large or wide open and not completely formed, the measured figure will suddenly jump when the file tip gets close to the apex.</p> <p>Moisten the canal with oxydol or a 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 : DFA 01210001  
MM YY Serial

## 9 Specification

### Equipment Class

Model:	AL-DFA20
Trade name:	Dr's Finder Neo
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)

### Operation, transport, and storage condition for the main unit

	Operation	Storage	Transport
Temperature	10~40C	0~40C	-10C~50C
Humidity	10~80%	0~80%	0~80%
Atmospheric pressure	800 ~ 1060 hPa		

### Additional Information

	Measurement	
Main unit		Approx. 43 x 46 x 16 mm / Approx. 24 g
File hook	Length	Approx. 200 mm (included hook tip)
Lip hook	Length / Dia.	Approx. 65 mm / Approx. 2.15 mm
Probe cord	Length	Approx. 70 cm
Extension cord	Length	Approx. 60 cm
Stand	Measurement	Approx. 43 x 67 x 62 mm / Approx. 52 g

### EMC Information

Guidance and manufacture's declaration – electromagnetic emission

Intended for use in the electromagnetic environment specified below.

The customer of the user of the AL-DFA20 should assure that it is used in such an environment

Emission test	Compliance	Electromagnetic environment – guidance
RF emissions	Group 1	The 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 emissions	Class B	The AL-DFA20 is suitable for use in all establishments, including domestic establishments and those establishments directly connected to the public low-voltage power supply network with specific
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable	

# 9 Specification

Guidance and manufacture's declaration – electromagnetic immunity

The AL-DFA20 is intended for use in the electromagnetic environment specified below.

The customer or the user of AL-DFA20 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8kV, ±15 kV	Type of Discharge (contact discharge) : ±8 kV contact Type of Discharge (air discharge) : ±2 kV, ±4 kV, ±8kV, ±15 kV air	Floors should be wood, concrete or ceramic tile. If floor 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	2 kV (DC power input port) 0.5 kV (Signal port)	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±0.5 kV & ±1 kV differential mode ±0.5 kV, ±1 kV & ±	0.5, 1.0 kV (line to line) 1.2/ 50 µs pulse	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on powersupply input lines IEC 61000-4-11	100 % UT (100% dip in UT.) for 0.5 cycle 100 % UT (100%dip in UT.) for 1 cycle 30 % UT(70% dip in UT) for 25/30 cycles 100 % UT(100% dip in UT.)	Voltage dips and interruption : Dip to 40% for 5cycles(100 ms) Dip to 70% for 25 cycles(500 ms) Dropout to 5% for 10ms>95 % for 5 secUt : 230 Vac	Mains power quality should be that of a typical commercial or hospital environment. If the user of the model AL-DFA20 requires continued operation during power mains interruptions, it is recommended that the model AL-DFA20 be powered from an uninterruptible power supply or a battery.
Power frequency	30 A/m	30 A/m (r.m.s)	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial

NOTE: UT is the a.c. mains voltage prior to application of the test level.

Conducted RF IEC61000-4-6	3 Vrms 150 kHz to 80 MHz 6 Vrms in ISM band 3 V/m 80 MHz to 2.7 GHz	Frequency range : 0.15 MHz – 80 MHz Test level : 3 Vrms unmodulated Amplitude Modulation : AM, 80 %, 1 kHz Audio signal	Portable and mobile RF communications equipment should be used no closer to any part of the AL-DFA20, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.2 \times P^{1/2} \times P^{1/2} \times P^{1/2}$ 80 MHz to 800 MHz $d = 1.2 \times P^{1/2}$ 800 MHz to 2,5 GHz
Radiated RF IEC61000-4-3	385MHz-5785MHz Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communication equipment (Refer to table 9 of IEC 60601-1-2:2014)	Frequency range : 80 MHz to 2.7 GHz Test level : 3 V/m (measured unmodulated) Amplitude Modulation : AM, 80%, 1kHz Audio signal	transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. <sup>1</sup> Interference may occur in the vicinity of equipment marked with the following symbol:

NOTE 1 UT is the a.c. mains voltage prior to application of the test level.

NOTE 2 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 3 These guidelines may not apply in all situations.

Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy.

To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered.

If the measured field strength in the location in which the AL-DFA20 used exceeds the applicable RF compliance level above, the AL-DFA20 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the AL-DFA20.



## 9 Specification

### 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.



Check user manual.



Type BF applied part  
(File hook, Lip hook)



Manufacturer



Prevent by wet.



PAPER

This box is paper recyclable.



Do not device on place where  
get direct sunshine.



Fragile item



Transport temperature.

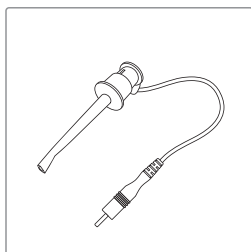


No hooks

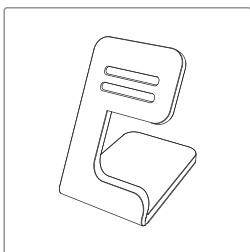


Authorized representative in the European Community

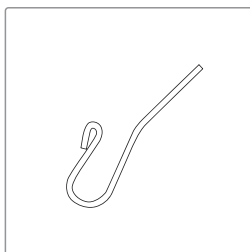
## 10 Accessories



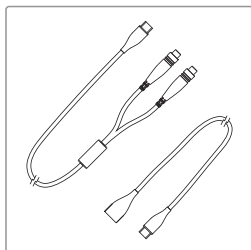
File hook (x 2 ea)



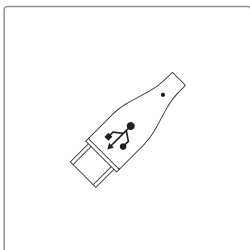
Stand



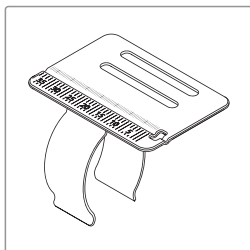
Lip hook (x 3 ea)



Probe cord & extension cord



Calibration jig



Ruler (x 2 ea)

## 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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Website: [www.gooddrs.de](http://www.gooddrs.de)

**Good Doctors Co., Ltd.**

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E-mail : [info@gooddrs.com](mailto:info@gooddrs.com) Website : [www.gooddrs.com](http://www.gooddrs.com)

**Warranty card**

We guarantee the quality of the product as follows

**Name of product :**

**Name of model :**

**Customer information**

- Office name :
- Office phone :

**Distributor**

- Dealer name :

**Assurance period**

- Date of purchase : from \_\_\_\_\_ , 20\_\_\_\_
- Product is for 1 year except accessories.

**< Assurance details >**

1. If there is any defect of manufacturer or product has any fault itself within the assurance period, it will be replaced with the same product.
  - Malfunction and damage according to user's carelessness.
  - Malfunction and damage according to natural disaster such as fire, earthquake and flood etc.
  - Malfunction and damage according to user's intention or accident.
  - Malfunction and damage according to using incompatible product.
3. The manufacturer does not accept any liability resulting misuse.



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