



**YD-2**  
**APEX LOCATOR**

**ISO9001 : 2000**      **CE**

**USER MANUAL**

**Please read this manual carefully before use**

Zhongnan Dental Devices Co. , LTD.

## **Catalog**

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## 1、 Working principle

The equipment works by sending pulse signal for activation effect and physiological resistance to get data, which will be processed by the internal computer to show the result through data show, visual display of simulation and sound & light alarm.

## 2、 Functions and application :

This instrument in one of **BF** equipment which has an inner DC power supply, marked by .

This equipment is used in dentistry, it has 3 functions:

1. To measure the dental pulp vitality( to determine whether the dental nerves are alive or dead).
2. To measure tooth apex location.
3. To determine whether the dental caries is penetrated.

## 3、 Specifications :

1. Voltage: DC  $7V \pm 20\%$  (built-in lithium rechargeable batteries)

2. The dental pulp vitality measurement(V-T)active status

Pulse frequency:  $20\text{Hz} - 140\text{Hz} \pm 30\%$ (intervals)

Electrode voltage: Max output voltage  $\leq 8\text{V}$ (effective value)

Electrode current:  $\leq 0.5\text{mA}$ (effective value)

Output power  $\leq 0.01\text{w}$

Electricity stimulus: 00-80

The stimulus increase rate:  $< 8$  times/second

The number remain frozen on the screen after stimulus stops: 2-15 seconds

3. The apex location(the root canal length) measurement(R-T)active status

Pulse frequency :  $500\text{Hz} \pm 30\%$

Pulse width:  $1\text{ms} \pm 30\%$

Electrode voltage:  $\leq 0.2\text{V}$  (effective value)

Electrode current:  $\leq 40 \mu\text{A}$ (effective value), instant power output:  $0.01\text{mW}$

## 4、Structure

The host is composed of color LCD, electronic control system (computer mode) and internal power supply.

Dimensions: 105mm×80mm×115mm

Probe: dental expansion probe: 25mm (length)

Hook electrode:  $\Phi 2 \times 70$ mm

Measuring pen:  $\Phi 90 \times 165$ mm

## 5、Instruction of components display

1 testing socket

2 DC recharge socket

3 trademark

4 pulp vitality measurement state sign: V-T

5 apex location (root canal length) measurement state sign: R-T

6 power switch

7 pulp vitality/apex location (root canal length) indicator

8 function switch (V-T: pulp vitality measuring; R-T: apex location (root canal length) measuring; C-T: dental caries hole penetration measuring)

9 penetration determination indicator

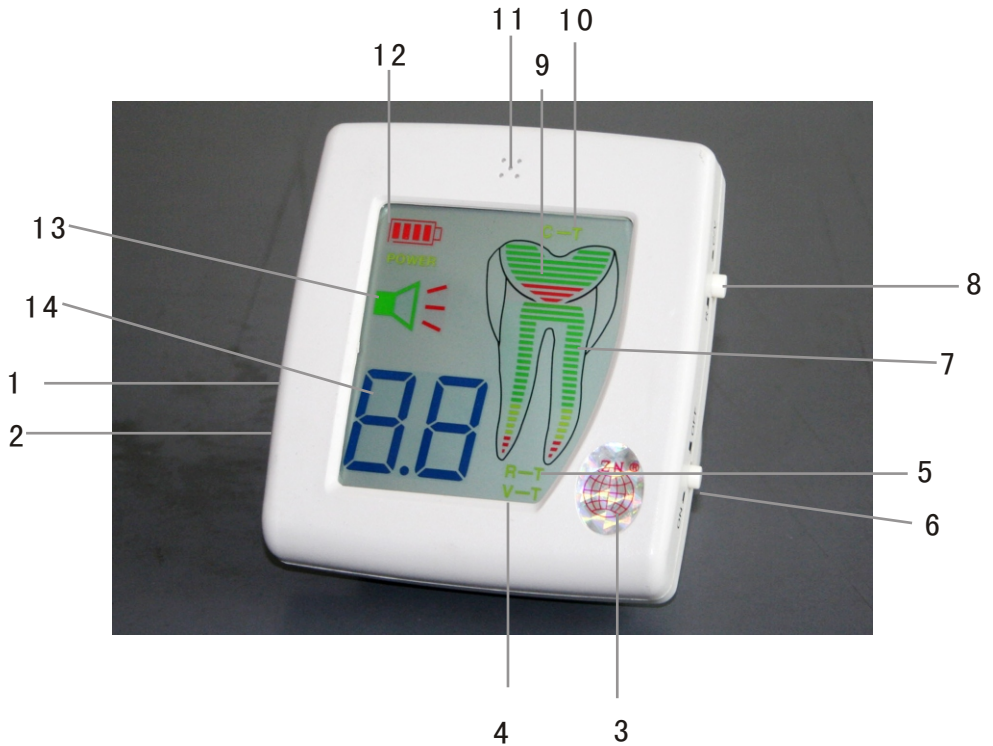
10 dental caries hole penetration measurement state sign: C-T

11 beeper

12 battery power indicator

13 alarm indicator

14 data indicator



## 6、 Operation :

### I . Pulp vitality measurement

**A.** Put the host on the operation table, connect the measuring cable and then insert measuring cable into testing jack (1), turn on the power switch(6) to start host. Then all the signal in the LCD screen display for a short time. The power indicator(12) shows the power condition, set the function switch(8) to pulp vitality measurement mode (the pulp vitality measurement state sign(4) on the right bottom of the screen shows V-T), the data indicator (14) shows 00, it means the equipment is operating normally.

**B.** Insulate saliva strictly. Clean up and dry the teeth surface with medical cotton, especially make sure whether the adjoiner is dry, this

step is to avoid the stimulus current conduct to neighbor teeth through gum or adjioner to cause a false data.

**C.** Connect the measuring pen with the measuring cable in the anode(red) end. Connect the hook electrode to the cathode(blue) end. Let the sufferer hold the hook or hang it into the sufferer's mouth. Contact the tip of measuring pen(better with some conducting resin like teethpaste) with the dentalface in the 1/3 position below the dental tangent plane. Then the electrocircuit will process automatically, the numbers shown in the data indicator(14) will increase automatically too, the pulp vitality indicator(7) shows the measuring result.

**D.** Please measure the adjacent teeth of the tested tooth first, to assure the measurement result.

**E.** When the sufferer feels painful or anesthetic(the sufferer will tell you), release the tip from the dentalface, take it out from the sufferer's mouth. The stimulus stops immediatly. The numbers shown in the data indicator (14)will remain frozen for few seconds. And the numbers are the measurement data.

**F.** The max number of the stimulus is 80

- 1) If the number is between 0-60, the pulp vitality indicator(17) turns green, the sufferer feels painful or anesthetic, and the alarm indicator(13) and the beeper(11) do not alarm, it means the tested tooth has good pulp vitality(the dental nerves are healthy).
- 2) If the number is between 61-79, the pulp vitality indicator(7) turns yellow, the sufferer has the reaction mentioned in 1), alarm indicator(13) and the beeper alarms indicator(11) interruptedly, it means the tested tooth has unhealthy pulp(the tooth nerves are non-sensitive).
- 3) If the number is 80, the pulp vitality indicator(7) turns red, the sufferer has no reaction mentioned in 1), and alarm indicator(13) is gleaming, beeper alarms(11) continuously, it means the tested tooth has no pulp vitality(the tested tooth nerves are dead).

**G.** Pull out measuring cable plug after measurement, set the power switch to OFF.

## II. **measuring teeth apex location(root canal length)**

**A.** Start the equipment in the same way of pulp vitality measurement, set the function switch to the apex location measurement mode, the apex location measurement state sign(5) on the right bottom of the screen will show R-T, the data indicator(14) will show **FF**, then the equipment is operating normally.

**B.** Connect the measuring cable anode with hook electrode, then hang it into a corner of the sufferer's mouth, and let it contact with oral mucosa.

**C.** Connect the oral mucosa with the spring electrode of measuring cable, if data indicator shows **OU**, apex location indicator(7) shows 3 grids of red sign, beeper gives a long beep, it means the oral physiological resistance is normal(repeated this test procedure is recommended).

**D.** Clamp the probe with the spring electrode, then insert the probe into the root canal which is dry and let it be inner step by step.

- 1) When the probe is above the apex, the apex location indicator will turn green, data indicator will show 3.0--0.6, but it will be without sonic or optical alarm.
- 2) If tip of apex location indicator turns yellow, data indicator displays **AP**, the alarm indicator and beeper alarm interruptedly, it means the probe reaches the interface of physical root tip and the apex exactly. After that , remove the mark initialized in the probe to the border or edge of hole, then take out the probe, the length displayed by the probe is the root canal length.
- 3) When the probe exceeds the physical root tip hole, the apex locaton indicator(7) displays 3 grids of red, alarm indicator gleams and beeper alarms continuously, data indicator displays **OU**, it means the probe is over through the apex.

**E.** After measurement, take out measuring cable plug, set the power switch to OFF.

### **III Detecting whether dental caries is penetrated**

**A.** After starting the equipment, set the function switch to the dental caries penetration detection mode(dental caries penetration measurement state sign(10) on the right top of the screen will show C-T), the data indicator shows FF, it means the equipment is operating normally.

**B.** Hang the hook electrode which links the measuring cable to the annulus at the end of the dental caries probe.

**C.** Insulate saliva, clean up food residues and dry the dental cavity and blocks dilaipidated tissue, then wet the bottom of dental caries by cotton with physiological saline solution, don't leave too much saline water in the hole.

**D.** Contact the top plane of dental caries probe with the bottom of dental caries hole. Move it parallelly. Pay attention that put the probe at the position of possible penetration marrow.

1) Not penetrated: the penetration determination indicator(9) will turn green, data indicator will show  $\geq 0.4$  without no optical or sonic alarm.

2) Have been penetrated: the penetration indicator will show 3 grids in red, data indicator will show OU, alarm indicator will gleam and beeper alarm continuously.

3) Suspicious penetration: the penetration indicator will show 1-2 grids in red, data indicator will show 0.2-0.1, alarm indicator and beeper will alarm interruptedly.

**E.** Pull out measuring cable pulg after measurement, set the power switch to OFF.



## **7.Security advices**

1. Keep and use the equipment in the ambient temperature( $5^{\circ}\text{C}$  - $40^{\circ}\text{C}$ ) under ventilation and dry environment (relative humidity(RH)  $\leq 80\%$ ), avoid irradiation of sunlight and keep clean.
2. Hook electrode, probe and the grey link cable should be sterilized and high-pressure disinfected before using, other accessories should be disinfected with ordinary medical disinfection.
3. Turn on the power if the screen displays abnormal, check the Battery indicator(12), the battery should be recharged immediately when it shows insufficient. The battery indicator will display “
4. “recharging” while recharge it. Don't short circuit the anode and cathode or contact both anode and cathode to metal at the same time. Turn off the power switch after measurement.
5. The equipment is guaranteed against defects in materials or workmanship for two years. Dismantlement or repair by unqualified repairer will cause the computer disorder automatically.
6. Do not connect high frequency(HF) medical operation equipment with this equipment to a sufferer at the same time, otherwise the equipment would be damaged. Do not use this equipment in any short waves or mini waves around(1m around), or the equipment will work abnormally.
7. It is forbidden to use this equipment for those who suffer from serious abnormal heart rate and those with heart pacemaker. just operated: relative humidity(RH) level are too high, dry the testing jack by heat blower.  
Other problems: please contact with manufacturer in time.

## **8. Breakdowns and repairs**

1. Disabled color LCD: check the power switch to make sure it is in "ON" state.
2. Color LCD is normal but system is abnormal: check battery level, if battery is insufficient, recharge the battery immediately.
3. Sufficient battery while color LCD remains in a fixed state or changes abnormally, and there is no sonic or optical alarm: check the detecting jack, plug and other connecting components.
4. There is sonic and optical alarm while the equipment is just operated: relative humidity(RH) level are too high, dry the testing jack by heat blower.
5. Other problems: please contact with manufacturer for repair in time, the telephone number is 86-731-84511078.

## **9. Storage and transportation**

Please store and transport the equipment under dry and good ventilation atmosphere at ambient temperature(-40°C-55°C), relative humidity $\leq$ 95% and without strong electromagnetic interface(E-MI). Avoid irradiation of sunlight, recharge the battery regularly, avoid water or moisture, place it carefully and lightly, do not be upside down or to striked or to high stress as well.

## **10.Approved official document No.:**

Production license No.

CE certification No.: BT0612060181( for standard EN60601-1:1990), BT0612060561( for standard EN60601-1-2:2002, EN61000-3-2:2000, EN61000-3-3:1995+A1:2001 )

ISO9001:2000(registration No.:05306Q12509ROS)

Production license No. For medical instrument manufacture: Xiang Medical Instrument Administration-Production license No.: 0012(2005)

The P.R.C Registration Certificate For Medical Device No.: Xiang Medical Instrument Administration-Production license No.:2550086(2005).

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