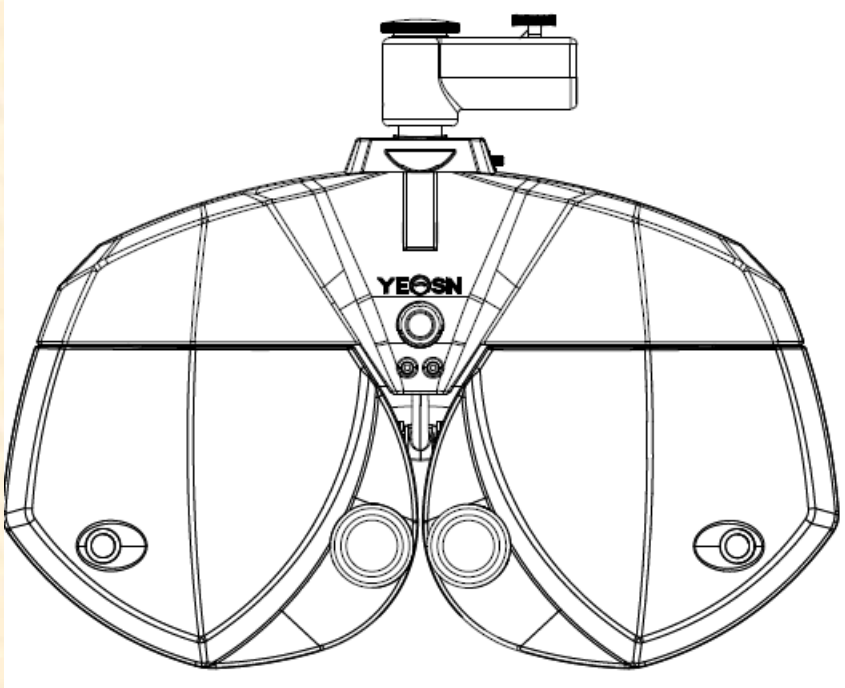
YPA-2100

DIGITAL REFRACTOR

User Manual



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Preface

Thank you for purchasing and using our digital refractor.

Please read this User Manual carefully before using this device. We sincerely hope that this User Manual will provide you with sufficient information to use the device.

Our pursuit is to provide people with high-quality, complete-function and more personalized devices. Information in promotional materials and packing boxes is subject to changes due to performance improvement without additional notice. Chongqing Yeasn Science & Technology Co., Ltd. reserves the rights to update the devices and materials.

If you have any questions during using, please contact at our service hotline: (86-023) 62797666, we will be very happy to help you.

Your satisfaction, our impetus!

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1. Specifications

1.1 Measurement range

The measuring range conforms to the requirements in Table 1.

Table 1 Vision tester measurement range

Item	Measuring range
Spherical power	-29.00D~+26.75D, Step size: 0.12D, 0.25D, 0.5D, 1D, 2D, 3D,
Cylindrical power	－8.75D～＋8.75D, Step size: 0.25D, 0.5D, 1D
Cylindrical axis	0~180°, Step size: 1°, 5°, 15°.
Prismatic power	0~20△, Step size: 0.1△, 0.5△, 1△, 2△, 3△.
Prism base	0~360°, Step size: 1°, 5°. Prim base can be marked horizontally or vertically.

1.2 Host

1.2.1 Assistant lens

a. Automatic crisscross cylinder: automatic crisscross cylinder ±0.25D, ±0.50D, separating lenses, one at left, one at right (the axle is self-rotatory);

b. Fixed crisscross cylinder: fixed crisscross cylinder ±0.50D, one at left, one at right (the axle is fixed at 90°)

c. Pinhole plate: hole diameter 1mm, one at left, one at right;

d. ross plate: used when setting pupil distance, one at left, one at right;

e. Red and green optical filter: one is red optical filter (right) and one is green optical filter (left);

f. In ear polarized optical filter: one at 135° right and one at 45° left

One at 135° right/sphere 0.12D, one at 45° left/sphere 0.12D;

g. Circular polarized optical filter: two at left, two at right, one includes sphere 0.12D;

h. Maddox rod lens: right eye: red, horizontally, left eye: white, vertically;

i. Sphere for retinoscopy: +1.5D and +2.0D, one at left, one at right;

j. Decomposing prism: right eye: 6△BU, right eye: 10△BI

1.2.2 Adjustment range

1）Adjustment range of pupil distance: 48mm~82mm

2）Forehead base can be adjusted continuously; the adjustment range should reach at least 14mm;

3）Adjustable range of near vision optometry distance(distance of near-point rod): 150mm~700mm;

4）Corneal vertex marking: 12mm, 13.75mm, 16mm, 18mm and 20mm;

5）Horizontal adjustment: ±2.5°.

1.3 Power parameters

Input voltage	AC 100V~240V(±10%)
Input frequency	50/60 Hz
Input power	1.4-0.7A

1.4 Dimensions

1)	Host	400mm (L) × 92mm (W) × 311mm (H)
2)	Printing base	200mm (L) × 200mm (W) × 80mm (H)

1.5 Weight

1)	Host	about 3.8kg
2)	Printing base	about 0.8kg

* The design and specifications are subject to changes due to technical updates without additional notice.

2. Safety Precautions

Please read the following matters needing attention carefully in case of personal injury, device damages or other possible hazards:

● Use the device indoors and keep it clean and dry; do not use it under inflammable, explosive, high fever and dusty environment;

● Do not use the device near water; also be careful not to make any kinds of liquid drop onto the device. Do not place the device in damp or dusty places, or places where humidity and temperature change quickly;

● Make sure the device host is stably and reliably installed before using it; fall of the device host may cause personal injury or device failure;

● Dedicated power adaptor configured for the device should be used: model GSM60A15, Input AC

100V~240V, 1.4-0.7A, 50/60Hz, Output DC 15V, 4.0A.

● Make sure the input voltage is consistent with rated input voltage and the electric wire is correctly connected and well grounded;

● Do not use multi-pin socket or extend the power line to insert the plug of the device into power socket;

● Unplug power line and cut off power supply line especially under emergency circumstances; hold the power plug to pull out it from the socket rather than pulling the power cord;

● Do not touch the power line with wet hands. Check the power line and do not allow the power cord to be stamped, pressed by heavy objects or knotted;

● Power line damage may cause fire or electric shock. Please check it regularly;

● Before testing each patient, clean the contacting part with ethanol for disinfection;

● Cut off power and put on dust cover when not using it;

● Do not dismantle or touch the interior parts of the device, otherwise it may cause electric shock or device failure;

● The device has passed electromagnetic compatibility test, which is in accordance with IEC 60601-1-2:2014, EN 60601-1-2:2015 standard. Follow below instructions related to EMC (electromagnetic compatibility) when mounting and using the device:

- Do not use the device with other electronic devices to avoid electromagnetic disturbance;
- Do not use the device nearby other electric devices to avoid electromagnetic disturbance;
- Do not use a power adaptor that is not configured with the device, otherwise it may increase the
- electromagnetic emission measure, which may reduce the capacity of resisting disturbance.

Caution: The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For DIGITAL REFRACTOR:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement:

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

End user must follow the specific operating instructions for satisfying RF exposure compliance.

This device was tested for typical Head-worn operations, and designed to meet the requirements for exposure to radio waves established by the Federal Communications Commission (USA). These requirements set a SAR limit of 1.6 W/kg averaged over one gram of tissue. The highest SAR value reported under this standard during product certification.

For Printer:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

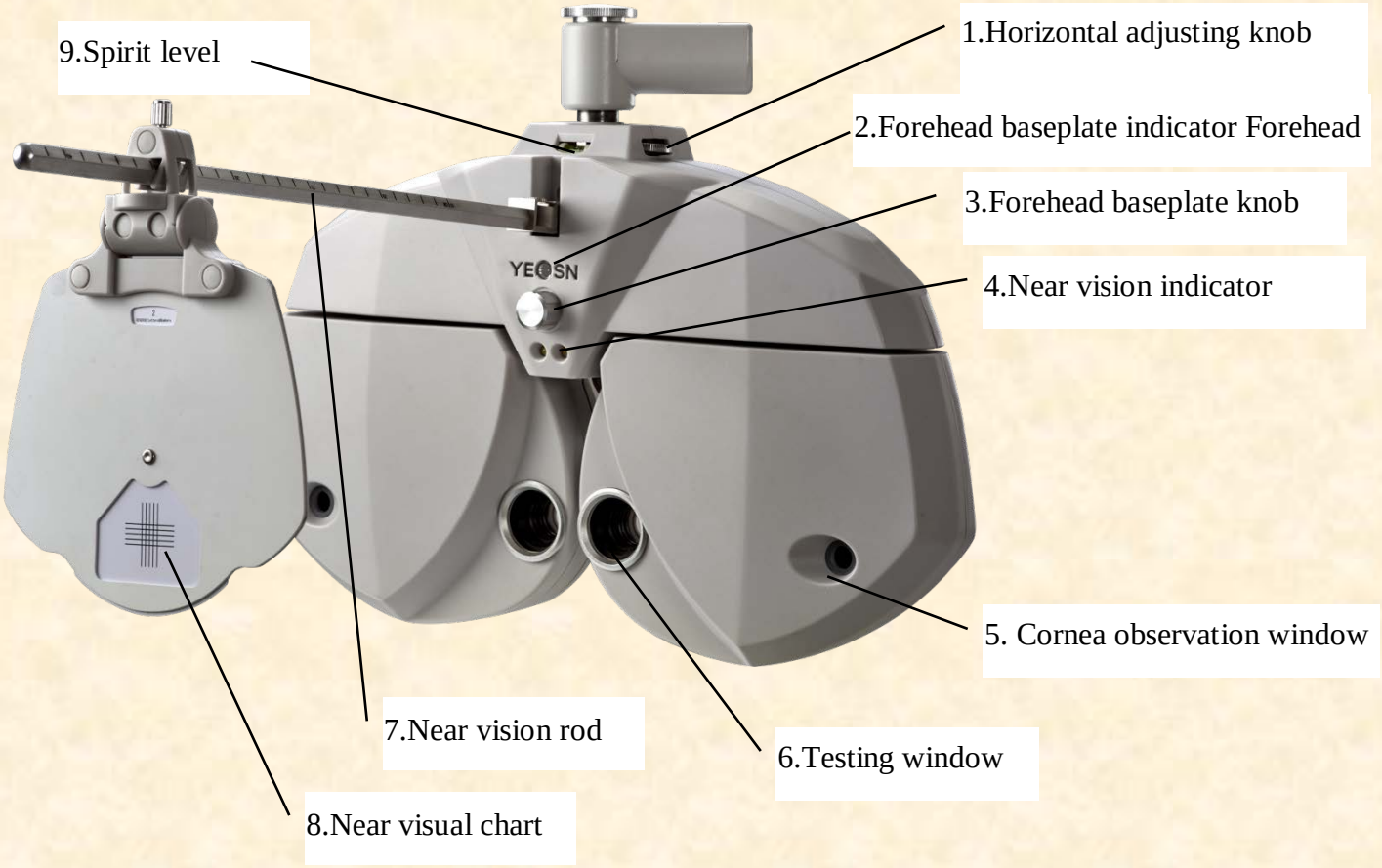
FCC Radiation Exposure Statement:

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

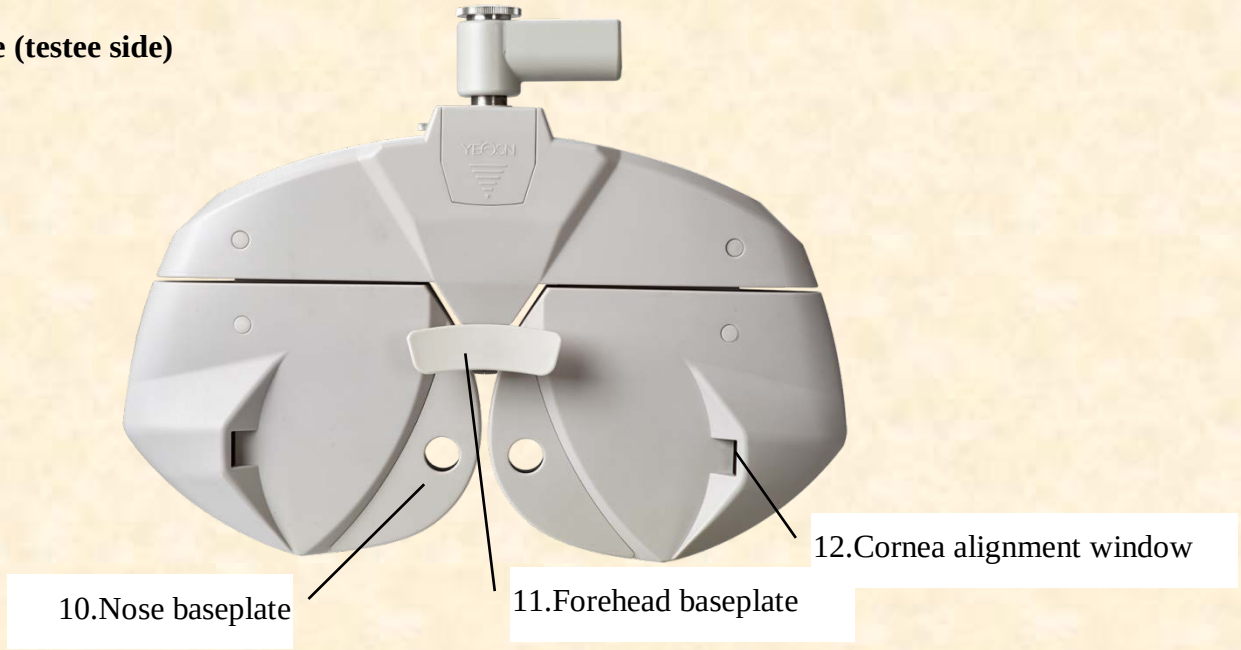
3. Main Structure

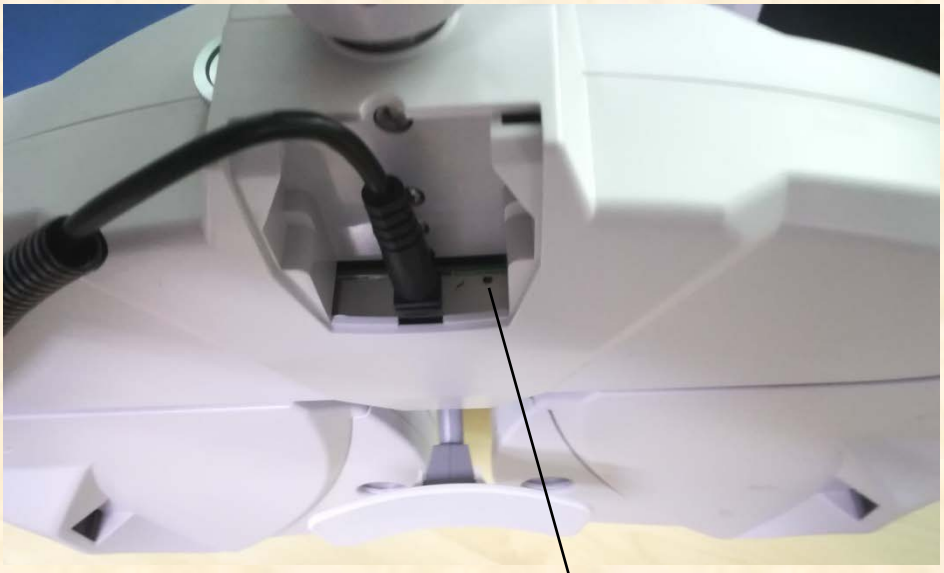
3.1 Host

Front side (tester side)



Back side (testee side)





13. Resetting button

1.Horizontal adjusting knob

Adjust the horizontal level of the vision tester.

2.Forehead baseplate indicator

Make sure the forehead of the testee contact the baseplate. The indicator is always on when the forehead doesn't contact the baseplate; the indicator is off when the forehead contacts the baseplate.

3.Forehead baseplate knob

Adjust the distance of the testee's corneal vertex

4.Near vision indicator

Light up short-distance visual chart during short-distance test.

5.Cornea observation window

⚠ Observation distance should be 200mm-250mm. The window through which to observe and confirm the distance of the tester's corneal vertex.

6.Testing window

Light aperture for testing.

7. Near vision rod

Install and support the near visual chart.

8.Near visual chart

For testing near vision.

9.Spirit level

Confirm the horizontal location of the vision tester. Rotate the horizontal adjusting knob to keep the air bubble in the spirit level in the middle.

10.Nose baseplate

The nose or face of the testee may contact the nose baseplate during vision test. Clean this part before every time of vision test.

11.Forehead baseplate

The forehead of the testee may contact the forehead baseplate during vision test. Clean this part before every time of vision test.

12.Cornea aiming window

Shows the alignment position of the testee's corneal vertex.

13. Resetting button

Set the main device to factory default settings by pressing and holding resetting button for 5 – 10 seconds.

3.2 Printing base

Front

Back

1.Power switch

Turn on power switch; power indicator is lit up.

2.Printing bin

Install printing papers.

3. Resetting button

Press and hold resetting button for 5-10 seconds and factory default settings of printer are restored.

4. USB Port

It is used for connecting and charging pad.

5.WLAN Port

It is used for internet communication. Communication cable is less than 1 meter.

6.LAN Port

Preserved port.

7.R232 serial port

Connect to lens meter LM, computer vision tester RK and PC (preserved port).

8.Power output interface

Connect to the power input interface of the host.

9.Power input interface

Connect to the output interface of the power adapter.

4. Installation Method

4.1 Part List

Digital refractor	1Set
Printing base	1Pcs
Near Vision Chart	1Pcs
Near Vision Rod	2Pcs (1Pc 40cm,1Pc 30cm)
Power adaptor	1Pcs
Dust cover	1Pcs
Blowing balloon with brush	1Pcs
Printing paper	2Rolls
Power Cord	1Pcs
DC power cord	1Pcs

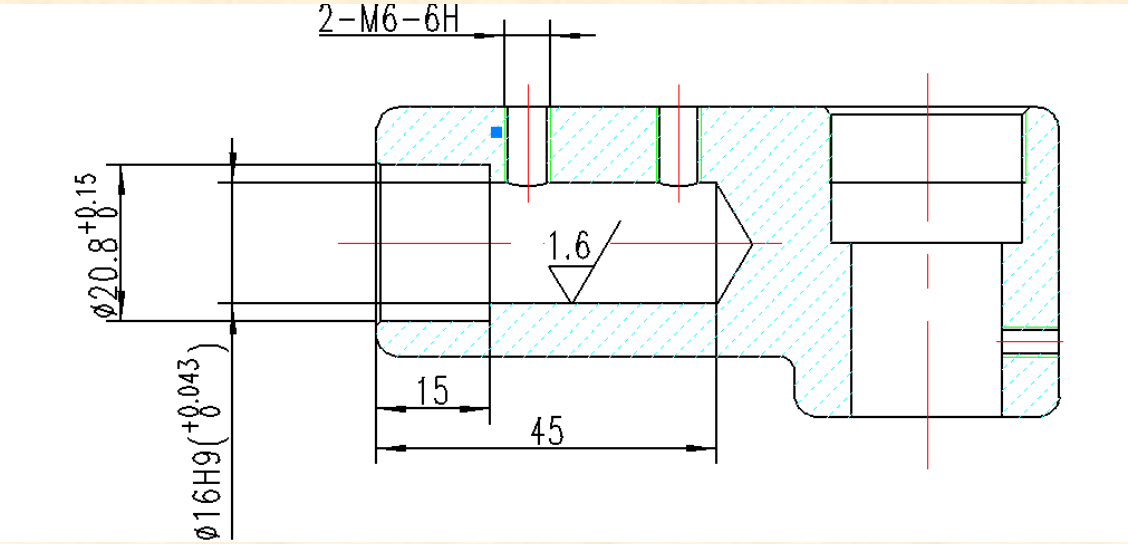
Hex wrench (1.5mm)	1Pcs
Hex wrench (2.0mm)	1Pcs
Hex wrench (2.5mm)	1Pcs
Hex wrench (3mm)	1Pcs
Screw	4Pcs (2Pcs for Near Vision Rod)
Lens scrubbing cloth	1pcs

4.2 Installation Instructions

4.2.1 Install the device onto the compound table

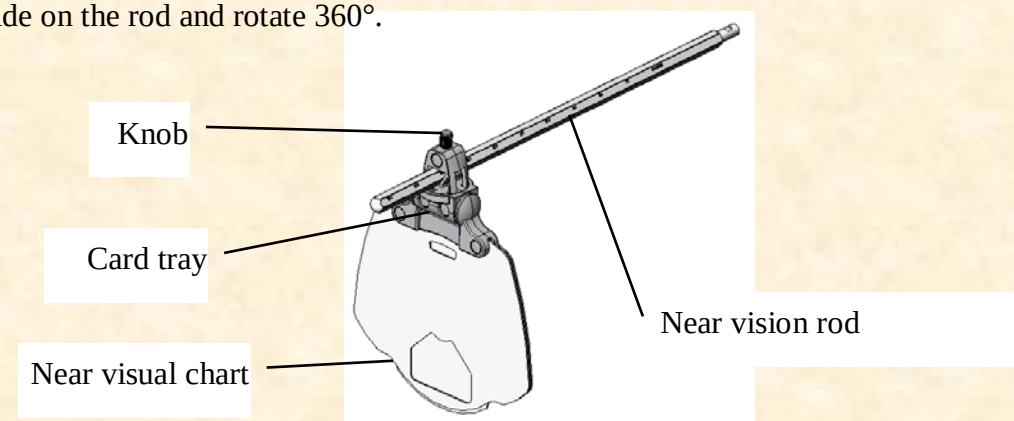
Take out 3 Pcs Stainless steel flat head set screw(M6*8), and then please refer to compound table manual, YPA-2100 DC Line maximum diameter is 11mm.

Please select the suitable compound table before installation as fol1ows.



4.2.2 Install near visual chart

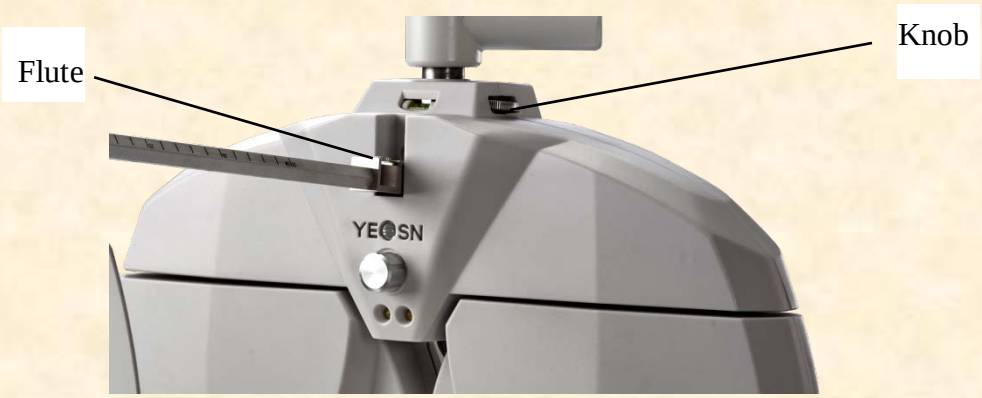
Insert the card tray of the visual chart into the near vision rod and screw the knob tight. The card tray can slide on the rod and rotate 360°.



4.2.3 Install near vision rod.

Insert the vision rod into the installation hole in the vision tester host and screw the knob.

Attention during installation: align the flute on the vision rod at the knob and keep the end of the vision rod close to the end of the installation hole in the vision tester host.



4.2.4 Horizontal adjustment after installation

Rotate the horizontal adjusting knob until the air bubble in the spirit level in the middle.

4.2.5 Install printing paper

Please refer to “Replace printing paper” (see 8.1).

4.2.6 Install APP

1）Please contact the dealer to download the dedicated APP

2）Install the APP pad recommendation: **Samsung** or **Huawei** 10-inch Android pad. Android operating system: version 4.3 and above. CPU/GPU: processor architecture ARM

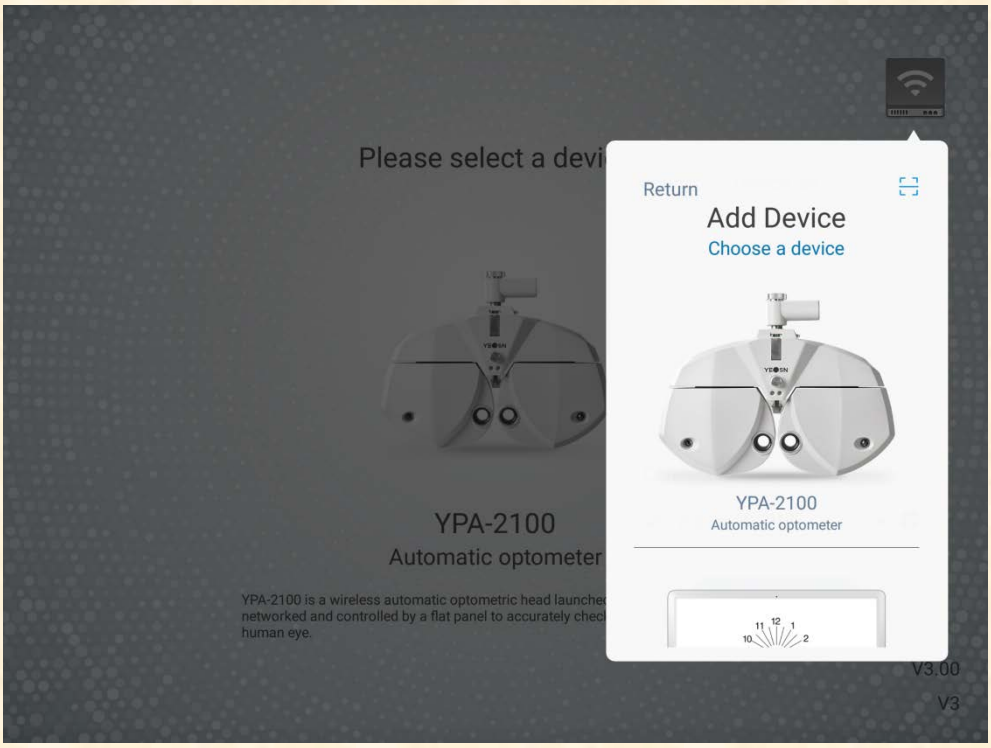
⚠ If you use other pad, fonts and images may be mismatched.

3）Connect the tablet WIFI to the router with "**SSID: yeasn_xxxxxx**", Password:**yeasn2002**.

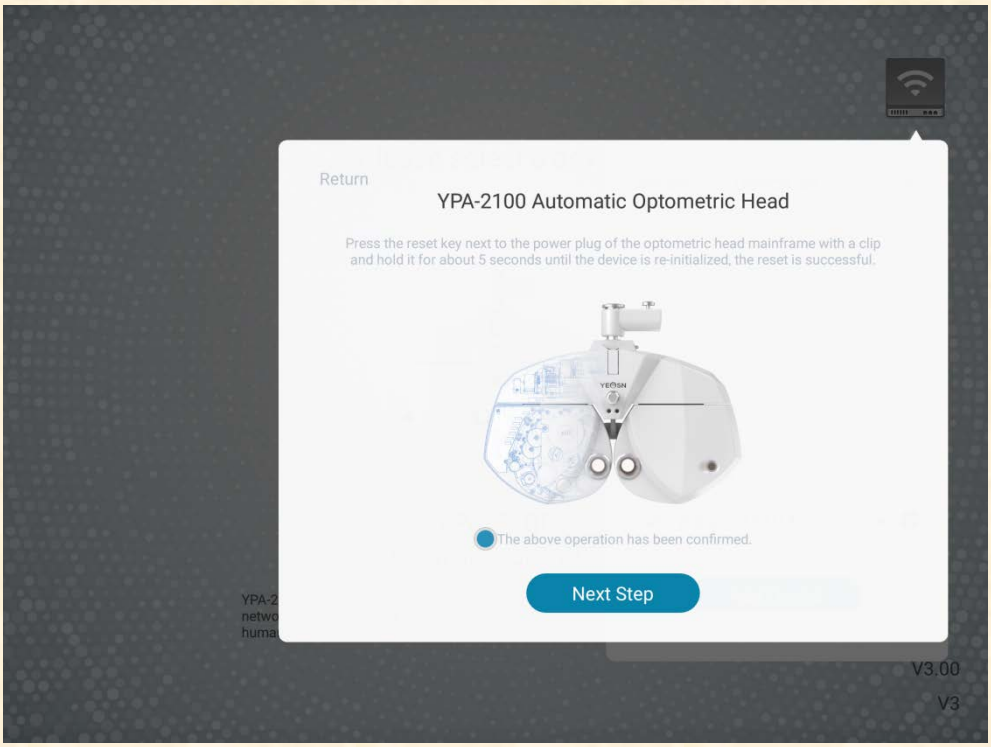
4）Wireless connection of PAD to the main device

a. Ensure WIFI on PAD is turned on, location based service is also turned on and APP is authorized when installing it.

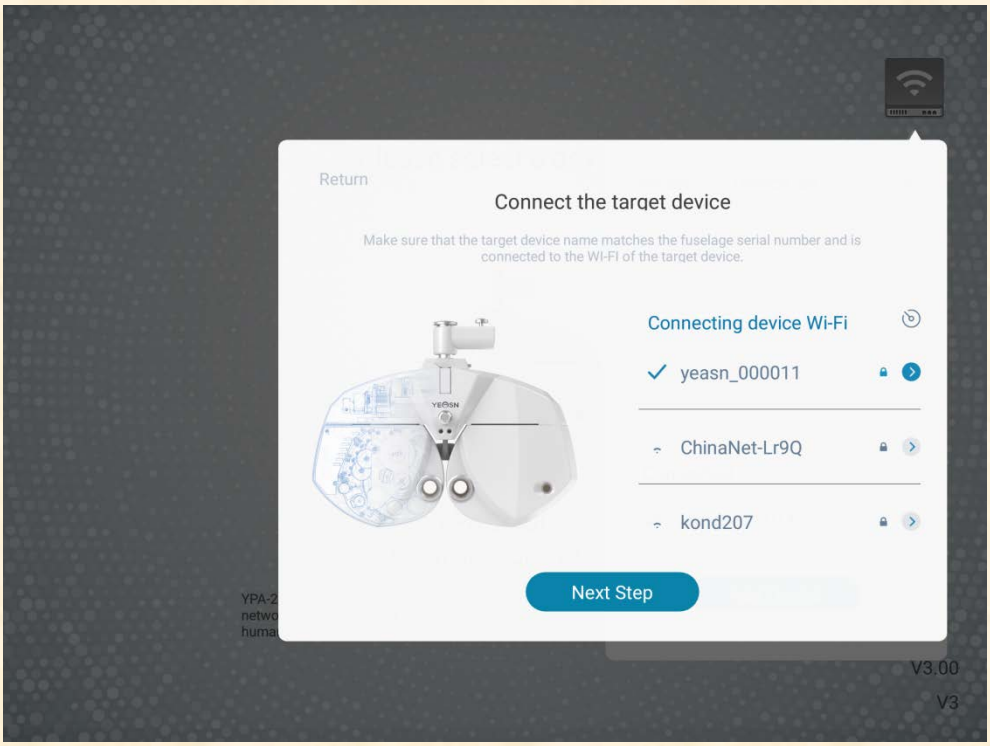
b. Log into APP on PAD as administrator. Tap the upper right , enter devices list and tap “add the device”, select YPA-2100 digital refractor icon.



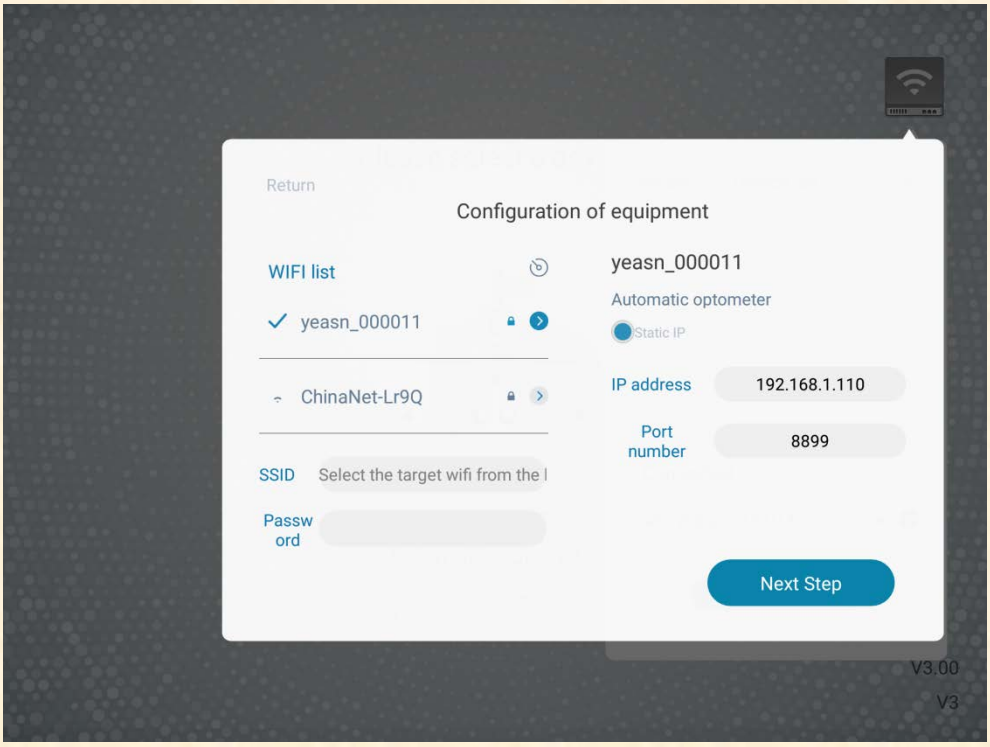
c. Tap “next step” and perform resettings according to the tips.



d. Select the WIFI network of product YPA-2100, enter WIFI password for connection. Then tap “next step”. As shown in the picture yeasn_000281 below, connection to yeasn_000281 is completed.



e. Select the router you need to connect to or WIFI signal of the printing box and enter password in the password field. Enter the required IP address in IP address field and enter the corresponding port number and click “next step” (when setting a single set of device the default configuration is being used, just click “next step”) and continue the configuration until the network connection to YPA main device is completed.



5. Directions for Use

5.1 Device Startup and Shutdown

5.1.1 Device startup

1）Insert the power plug into the socket.

The power adaptor configured with the device is three-pin plug, please select suitable power socket.

Note: please use dedicated power line configured with the device.

2）Start up the host first: press the power switch on the printing base, the power indicator is on.

3）After the host is initialized, start up the compound laptop and open the operation interface.

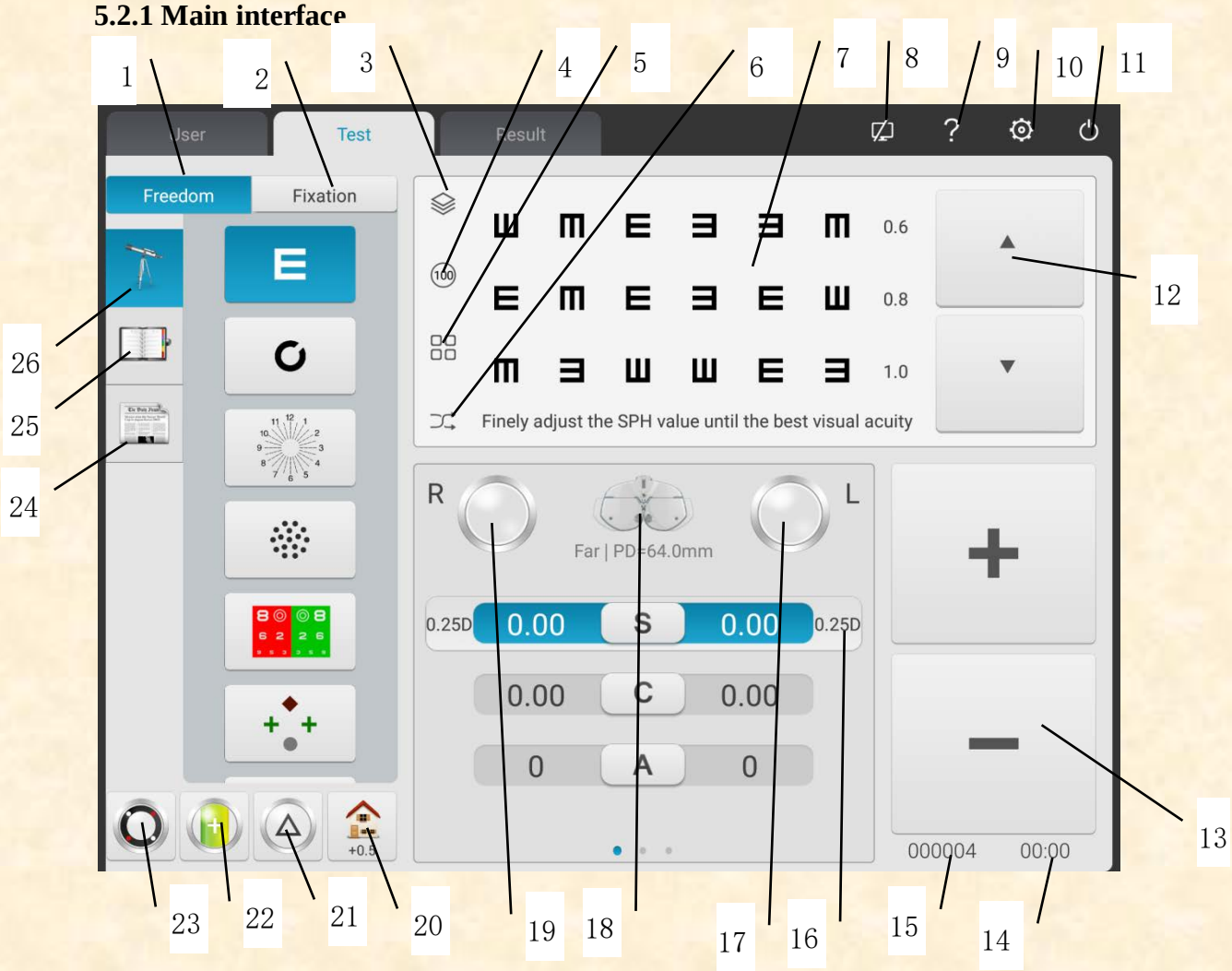
5.1.2 Device shutdown

1）Press the power swtich on the printing base to turn off the device, the power indicator is off.

2）Put the dust cover on the host.

5.2 Operation Interface

5.2.1 Main interface



1. Free mode Operators select sighting marks to perform optometry according to their preferences.

2. Procedure

Display current procedure.

3. Red green background/black and white color inversing

Red green color background can be selected. Black white color inversing in terms of sighting mark colors also can be quickly adjusted.

4. Contrast adjustment

Adjust contrast of sighting marks

5. Display mode of sighting marks

It can be single unit, single line, single row, full screen and ETDRS.

6. Random

Sighting marks appear randomly.

7. Display area of sighting marks

Display selected sighting marks with optometric tipping words at the bottom when performing optometry.

8. Connection state indication

Indicate network connection state to LCD display chart YPB-2100.

9. Sighting mark assitance

Display names, functions and using methods of sighting marks.

10. Parameters settings

After tapping it enter the parameters settings interface.

11. Exit

Exit operating program system.

12. Scroll display of sighting marks

Scrollable single-unit, single-line, single-row and full-screen display of sighting marks can be realized by pressing up and down buttons.

13.+、-

Data increase and decrease can be realized by pressing S\C\A\ADD\BIBO\BDBU.

14. Operation time

Display the time spent from beginning to the end.

15. Test number

16. Quick change of optometric step length

Optometric step length can be quickly changed by pressing S\C\A\BIBO\BDBU.

17. Left auxiliary disc lenses

Click this key to popup the choice box related to left auxiliary lenses.

18. Measurement mode

Distance: distance mode, Near: near mode.

Distance mode and near mode can be switched to each other by pressing “distance mode” or “near mode”.

19. Right auxiliary lenses

Click this key to popup the choice box related to right auxiliary lenses.

20. Quick setting

When S is positioned,

When C is positioned, a shortcut to equivalent spherical lens appears.

When A is positioned, a shortcut to axis angle of cylindrical lens appears.

When BIBO or BDBU is positioned, a shortcut to prism display mode switch appears.

When ADD is positioned, a shortcut to vision near light appears. It can be selected off or on.

21. Prism lens removal/setting

By pressing this key set and remove prism lens in the testing window.

22.Cylindrical lens -/+

It is used for positive and negative exchange of cylindrical lens.

23. Cross cylindrical lens

By pressing this key set and remove cross cylindrical lens in the testing window.

24.Sighting marks 2

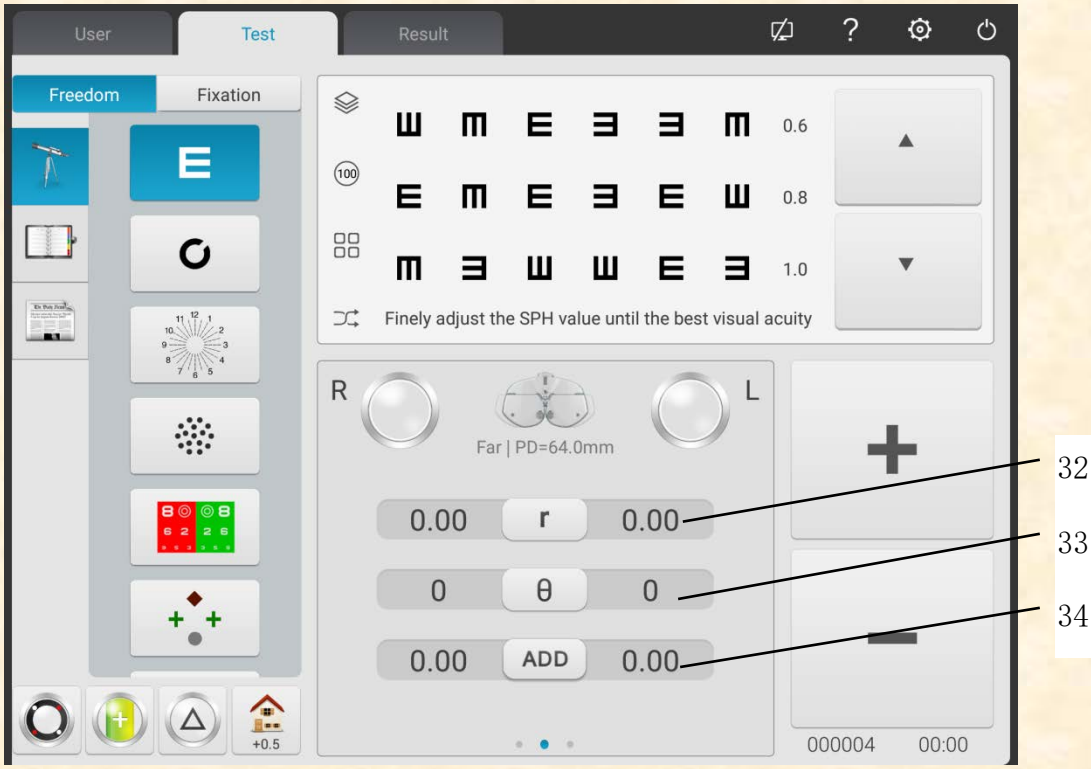
Select and display sighting marks, including near-point sighting marks, color blindness sighting marks and contrast sensitivity sighting marks.

25. Quick testing

Support divergence testing, convergence testing and near-point convergence testing (near-point convergence, near-point adjustment, negative relative adjustment, positive relative adjustment) and other functions.

26.Sighting mark 1

Select and display sighting marks, including vision sighting marks and functional sighting marks.



27. R

Right testing window, input right eye data and select right eye as the dominant eye.

28.L

Left testing window, input left eye data and select left eye as the dominant eye.

29. S

Spherical power input window

Press S input window aside R to input the spherical power of right eye; press S input window aside L to input the spherical power of left eye.

30.C

Cylindrical power input window

Press C input window aside R to input the cylindrical power of right eye; press C input window aside L to input the cylindrical power of left eye.

31.A

Cylindrical axis input window

Press A input window aside R to input the cylindrical axis of right eye; press A input window aside L to input the cylindrical axis of left eye.

32.r

Prismatic power input window

Press r input window aside R to input the prismatic axis of right eye; press r input window aside L to input the prismatic axis of left eye.

33.□ Prism base input window

Press input window aside R to input the prism base of right eye; press input window aside L to input the prism base of left eye.

34.ADD

Additional power input window

Press ADD input window aside R to input the additional power of right eye; press ADD input window aside L to input the additional power of left eye.

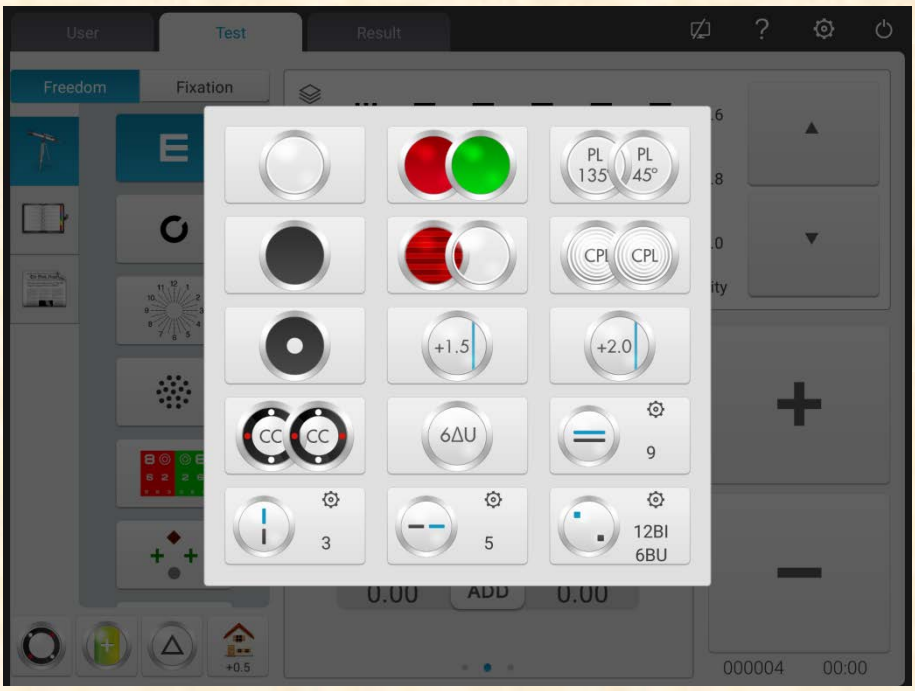
5.2.2 Assistant lens setup

1. Press “Assistant lens” key to display assistant lens interface.

2. Press corresponding keys in the interface to. The selected assistant lens will be called in the testing window and return to testing interface automatically.

Popup display interface after tapping left assistant lens

Popup display interface after tapping right assistant lens



Key functions are described as follows.

Open testing window

Baffle plate, shelter testing window

Pinhole plate (hole diameter 1mm)

Right eye: red optical filter, left eye: green optical filter

Right eye: 45° linear polarized optical filter, left eye: 135° linear polarized optical filter

Binocular: circular polarized optical filter

Right eye: fixed crisscross cylinder, left eye: fixed crisscross cylinder

Right eye: horizontal Maddox rod, left eye: open testing window

Right eye: open testing window, left eye: vertical Maddox rod

Retinoscopy lens, 1.50D and 2.0D optional

Binocular equilibrium prism, press to change prismatic power

Horizontal heterophoria prism, press to change prismatic power

Vertical heterophoria prism, press to change prismatic power

Right eye: 6△ base-upward prism

Left eye: 10△ base-inward prism

Left eye: base-upward prism, Right eye: base-inward prism, press to change prismatic power

5.2.3 Pupil distance input

1.Pressing

key, PD adjusting lens is called into the testing window.

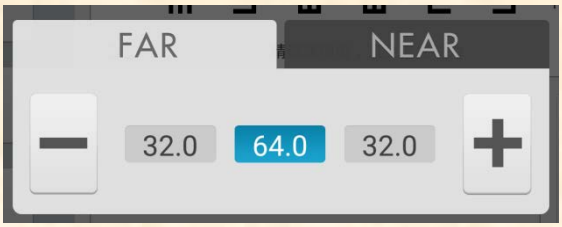
The factory default PD value is 64.0.

2. Click the data frame to be changed and input pupil distance.

Input left eye PD, binocular PD and right eye PD respectively.

Press “+” to enlarge PD, press “-” to reduce PD.

3. By tapping any position beyond PD entering interface, exit PD entering interface.



5.2.4 System parameter setup

1.Press to enter system parameter setup interface

2. Select needed parameter to change parameter setup.

3.After completing all the settings press and go back to the upper level.

Detailed parameters settings are described as follows.

1. step length

● S：0.12D、0.25D、0.5D、1D、2D、3D； Factory setting：0.25D

Set the step length of spherical power and select from 0.12D, 0.25D, 0.5D, 1D, 2D and 3D.

● C：0.25D、0.5D、1D； Factory setting：0.25D

Set the step length of cylindrical power and select from 0.25D, 0.5D and 1D.

● A：1°、5°、15°；Factory setting：5°

Set the step length of axis angle of cylindrical power and select from 1°,5°and 15°.

● △：0.1△、0.5△、1△、2△、3△；Factory setting：0.5△

Set the step length of prism power and select from 0.1△,0.5△,1△,2△ and 3△.

● θ：1°、5°；Factory setting：5°

Set the step length of basal angle of prism lens and select from 1°and 5°.

2. Lens type

●XC type：±0.25D、±0.50D、separation；

Factory setting：±0.25D

Set the cross cylindrical lens, which is put in the testing window and select from ±0.25D, ±0.50D and separating prism lens.

●XC+ covering slice: on and off. Factory setting: off.

Set whether to enable blocking slice when changing crisscross cylindrical lens surfaces 1 and 2.

Set it on, add the blocking slice.

Set it off, disable the blocking slice.

●S.E.Fix: only crisscross cylindrical lens, only cylindrical lens, on, off; factory default: only crisscross cylindrical lens.

Only crisscross cylindrical lens: only when C is increasing by each 0.25D, s is decreasing by 0.12D. Without crisscross cylindrical lens adjusting C does not result in changing S.

Only cylindrical lens: only when C is increasing by each 0.25D, s is decreasing by 0.12D. With

crisscross cylindrical lens adjusting C does not result in changing S.
On: Regardless of crisscross cylindrical lens or cylindrical lens, changes are equivalent.
Off: Changes will not be equivalent.

●Binocular balance blurred vision: automatical, 0.25D, 0.50D,0.75D, off.

Factory setting: automatical.

Call in binocular balance sighting mark and add blurred vision amount in accordance with settings.

●Red green balance blurred vision: 0.25D, 0.50D, off. Factory setting: off.

Call in red green sighting mark and add blurred vision amount in accordance with settings.

●CYL expression method：＋、－；

Factory setting：－

Set entering method of cylindrical lens power.

When setting it “-” only enter negative cylindrical lens power.

When setting it “+” only enter positive cylindrical lens power.

●Prism lens expression method：X/Y 、r/θ；

Factory setting：X/Y

Operator can select rectangular coordinates (X/Y) or polar coordinates(r/θ).

3. short-distance

●Short-distance indicator: on, except grid, off. Factory setting: off.

When it is set to on: in ADD mode and short-distance mode the indicator will be on automatically.
Except grid: the short-distance indicator is automatically on during ADD mode and short-distance mode. When choosing cross grid sighting mark for short-distance testing, the short-distance indicator is off.

When it is set to “Off”: the short-distance indicator is not automatically on. Turn it on by pressing the short-distance indicator button.

●Short-distance indicator brightness: low, intermediate, high. Factory setting: intermediate.

● F → N Link: SPH, SPH+ADD; factory default: SPH+ADD

Set the spherical value shifting from long-distance mode to short-distance mode.
SPH: the spherical value in long-distance mode is used in short-distance mode.
SPH+ADD: the additional power is added to the spherical value in the long-distance mode.

●ADD Estimation: on, off; factory default: on
Set if pre-add additional power according to the age of the patient during short-distance vision test.

● Working Distance: 35cm and 70cm, step length: 5cm. factory default: 40cm

4. Printing

●Date printing format: month-date-year, date-month-year, year-month-date. Factory setting: month-date-year.

Set printing data format.

●Clear data after printing: on and off. Factory setting: off.

Set whether to clear measured data after printing.

●Printer: on and off. Factory setting: on.

When setting it to off: by pressing printing the data will be sent to the network. Printer doesn't work.

●Prism lens printing: on and off. Factory setting: off.

When setting it to on, enable printing prism lens power

When setting it to off, disable printing prism lens power.

5. sighting marks

Select and display sighting marks, including sighting marks of near-point and distance-point .

6. Communication

●AR data: on and off. Factory setting: on.

It is used to determine whether to automatically receive the data from computer refractor. On: automatic receiving external data.

● AR data processing: C≤0.25D，C=0、C≤0.50D，C=0、off.

Factory setting：C≤0.25D，C=0

When AR cylindrical lens power is not more than 0.25D, reset the imported value C.

When it is set off, don't reset the imported value C.

● Data LM: on and off. Factory setting: on.

It is used to determine whether to automatically receive the data from focimeter. On: automatically receive data.

● Receive prism lens data from LM: on and off. Factory setting: off.

When importing data from focimeter set whether to automatically enter prism lens power data.

7. System

● Lens reset: fast, reset. Factory settings: fast.

Fast: return lens to zero and send the signal of returning lens to zero.

Reset: reset the main device and send resetting signal to main device.

● “Clean” tip: on and off. Factory settings: off.

When it is turned on, press button “clean” and pop-up appears with tips “Please confirm whether to clean the data. Yes or No”.

By setting the parameter “on” operator can protect the data from deletion due to accident pressing button “clean”.

●Sighting marks link: on and off. Factory setting: on.

When performing optometric testing avoid calling in the assistant lens or mode resulting from the corresponding sighting mark.

When setting is “on”, after pressing sighting mark S, C, A, X, Y maintain the current status and the assistant disk condition remains unchanged.

● Sound: off and on. Factory settings: on.

Off: no vibration or audio tips.

On: realize function only under +-

● Operation time: on and off. Factory setting: on.

Set whether to display the testing time.

By setting “on” it will display the time from the beginning of the tests to the end.

● Security: change password, forget password

● User: user switch and factory settings restoration

● Hall data: hardware inspection. Assistant after-sales maintenance.

● Address: enter the optical shop address

8. About

● About

Display system information (including software version and manufacture info)

5.3 Preparations before Use

1）Turn on power switch, the device is automatically initialized.

2）Confirm the device is leveled.

If the device is not leveled, rotate horizontal adjusting knob to keep the air bubble in the spirit level in the middle.

3）Start up the combined tablet computer used and open the operation interface.

4）Press

to input the patient's PD, call the PD adjusting lens in the testing window.

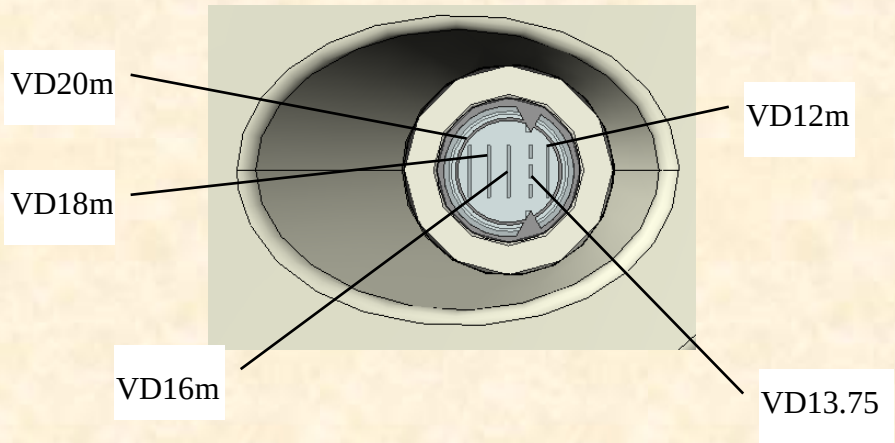
5）Keep the patient's forehead on the base plate, the indicator is off.

6）The tester can observe the testee's eyes through testing window to make sure his eyes are in the center of the testing window.

7）Adjust corneal vertex distance (VD).

The tester can confirm the corneal vertex distance of the testee through cornea observation window, from which the tester should be 200mm-250mm away. Rotate the forehead baseplate knob, adjust the corneal vertex of the testee to needed position.

The corneal vertex is marked below:



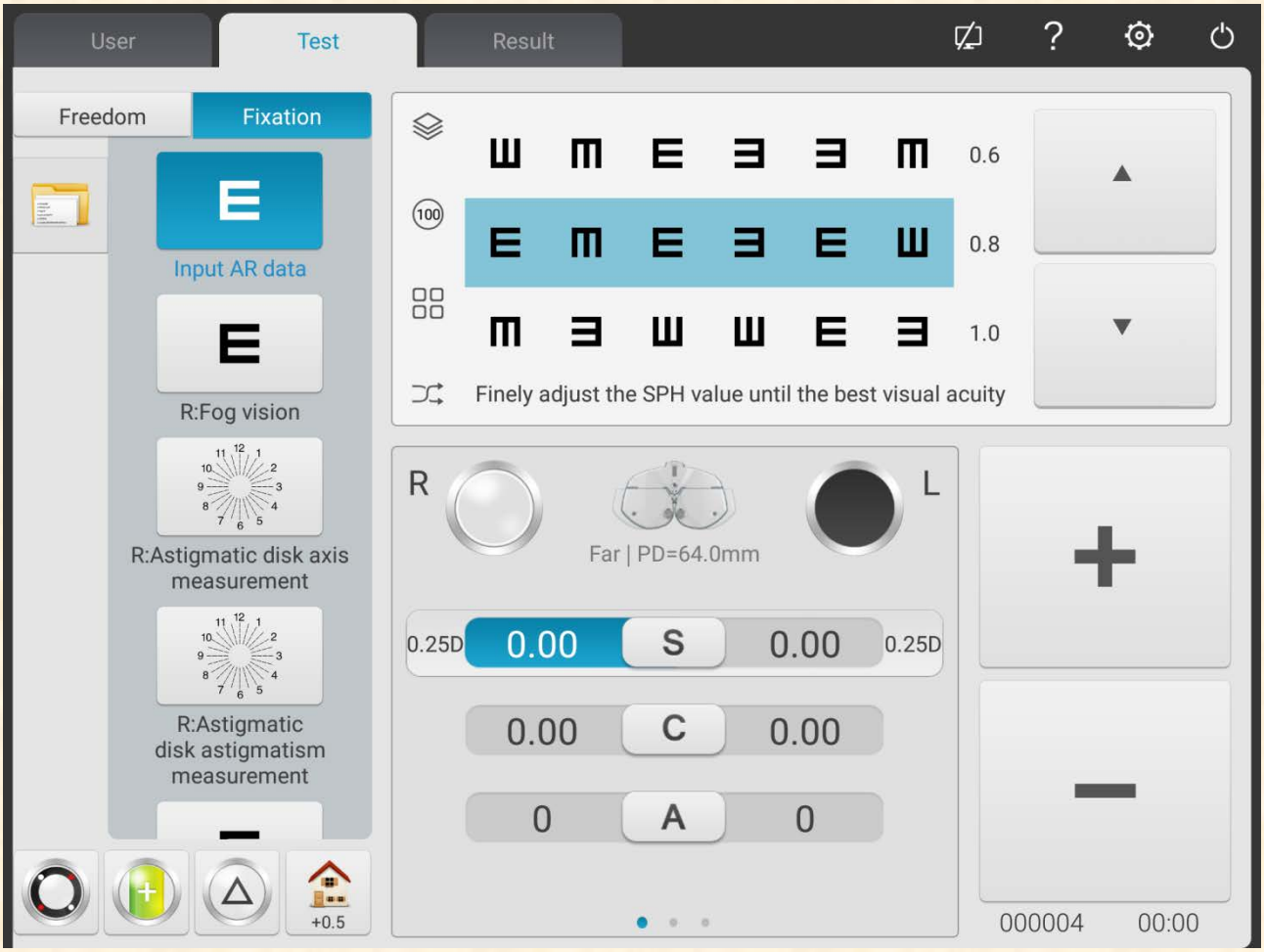
8）By tapping any position beyond PD entering interface, exit PD entering interface.

5.4 Standard Optometry Procedure

Press “ ”to start up standard optometry procedure.

1. Press

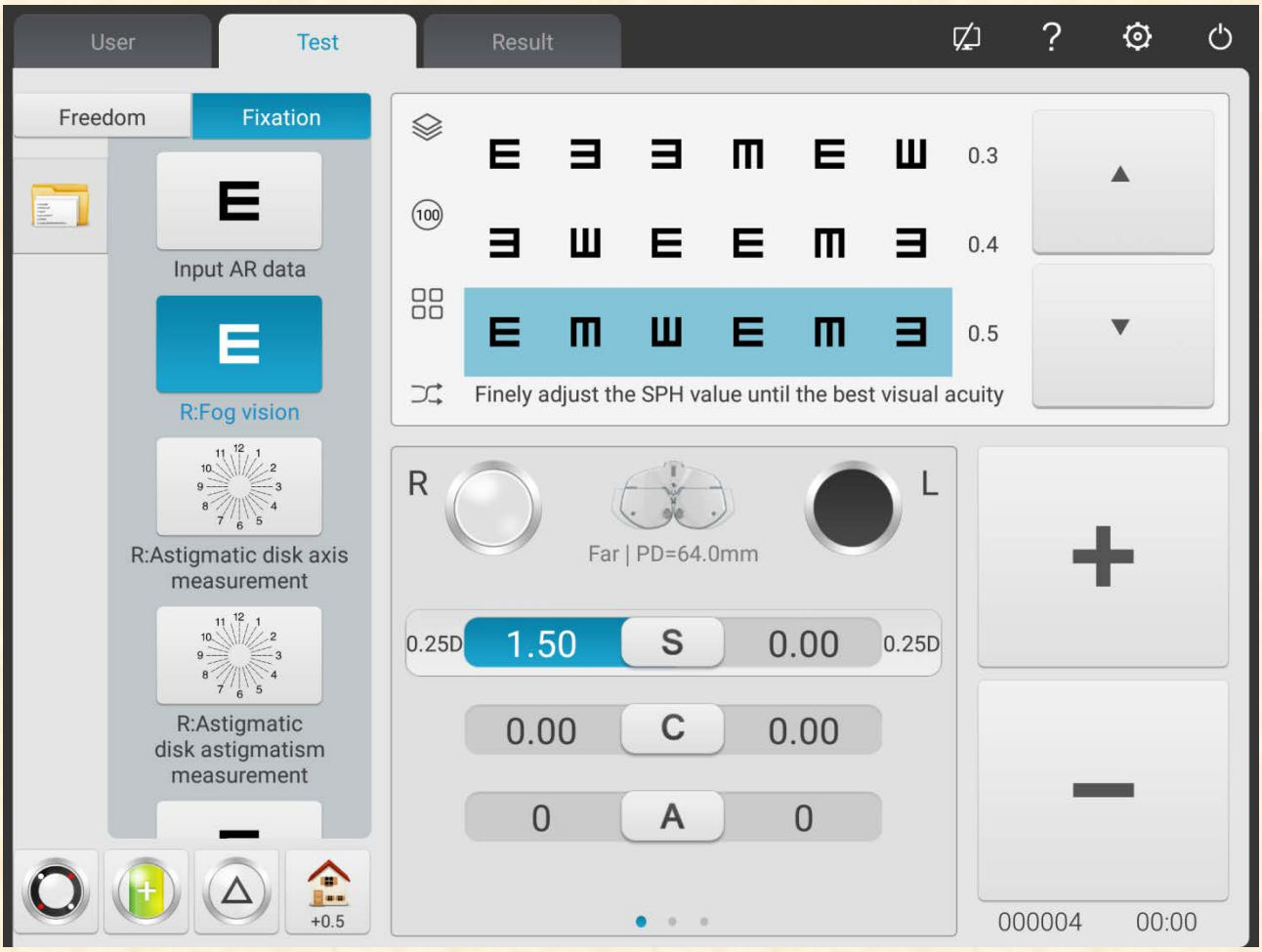
to input AR (computer refractor) measurement data:



2. Press

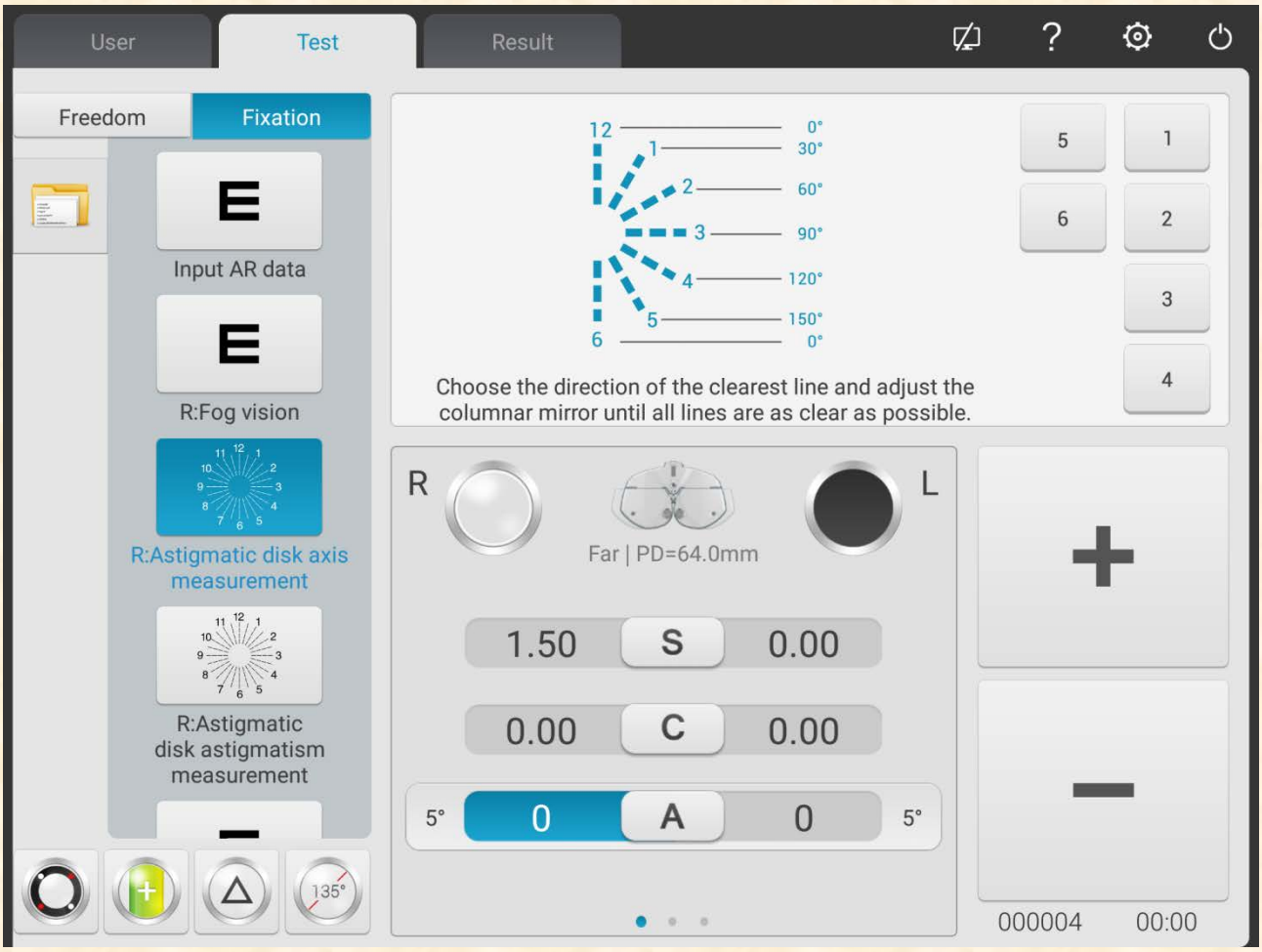
to begin SUBJ subjective correction.

Right eye scieropia. Baffle the left eye, change the cylindrical power of right eye to 0. Put on 0.5 sighting mark, and then gradually increase the positive spherical power until the 0.5 sighting mark becomes blurred.



3. Press

to test the astigmatic axis with astigmatism disk.



（1）Call in astigmatism disc sighting mark. Ask the patient:

● Do the definitions of all lines look the same?

● Which line looks especially distinct?

If the answers are:

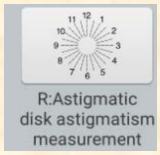
● The definitions of all lines look the same.

No astigmatism.

One line looks especially distinct.

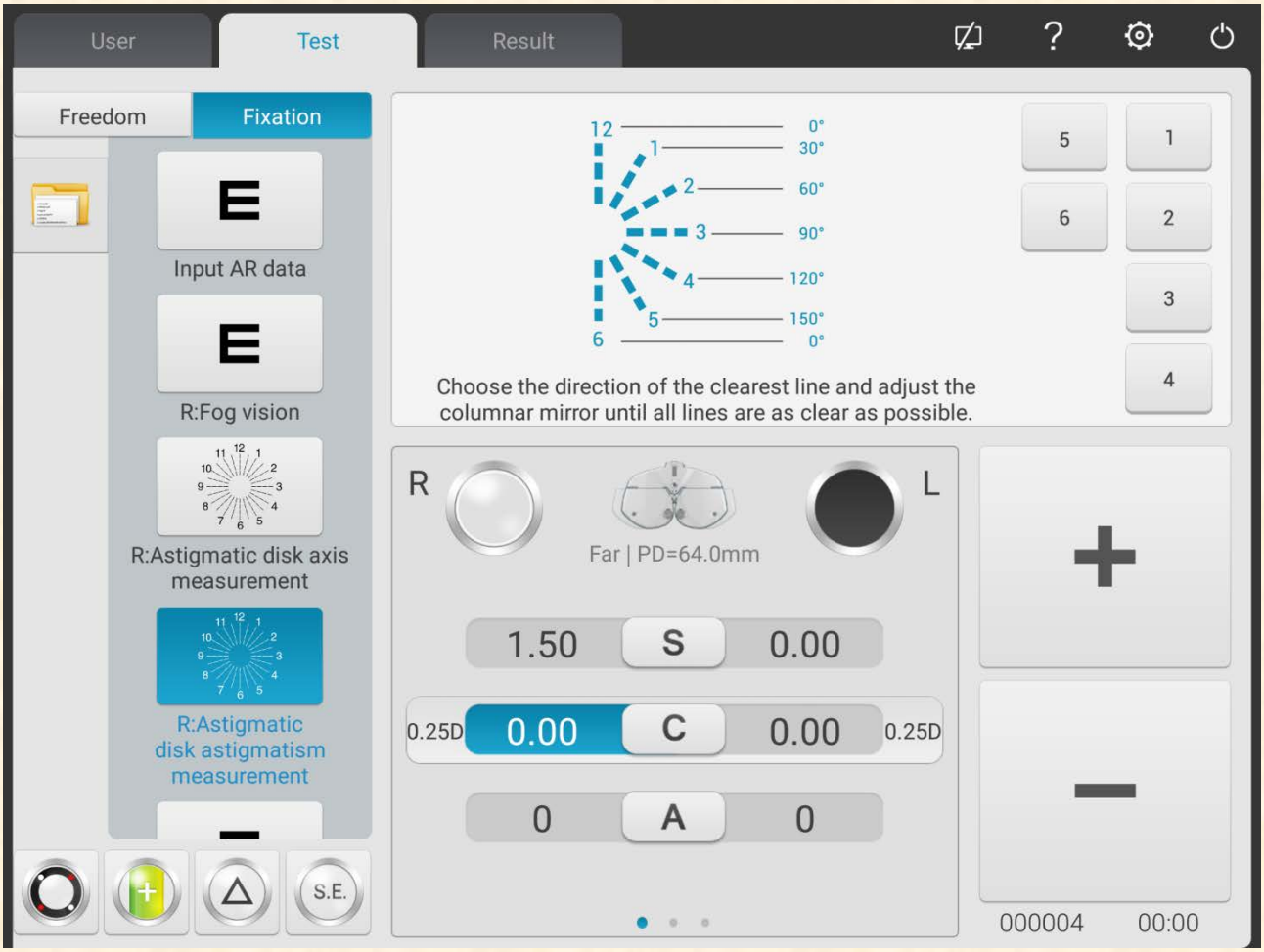
Multiply the smaller figure (1~6) corresponding to the especially distinct line with 30°, the astigmatic axis of the negative cylinder can be obtained. For example: line 3-9 is especially distinct, the astigmatic axis is 3×30°=90°.

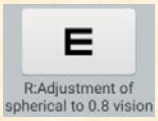
（2）Input the obtained axis data

4.Press 

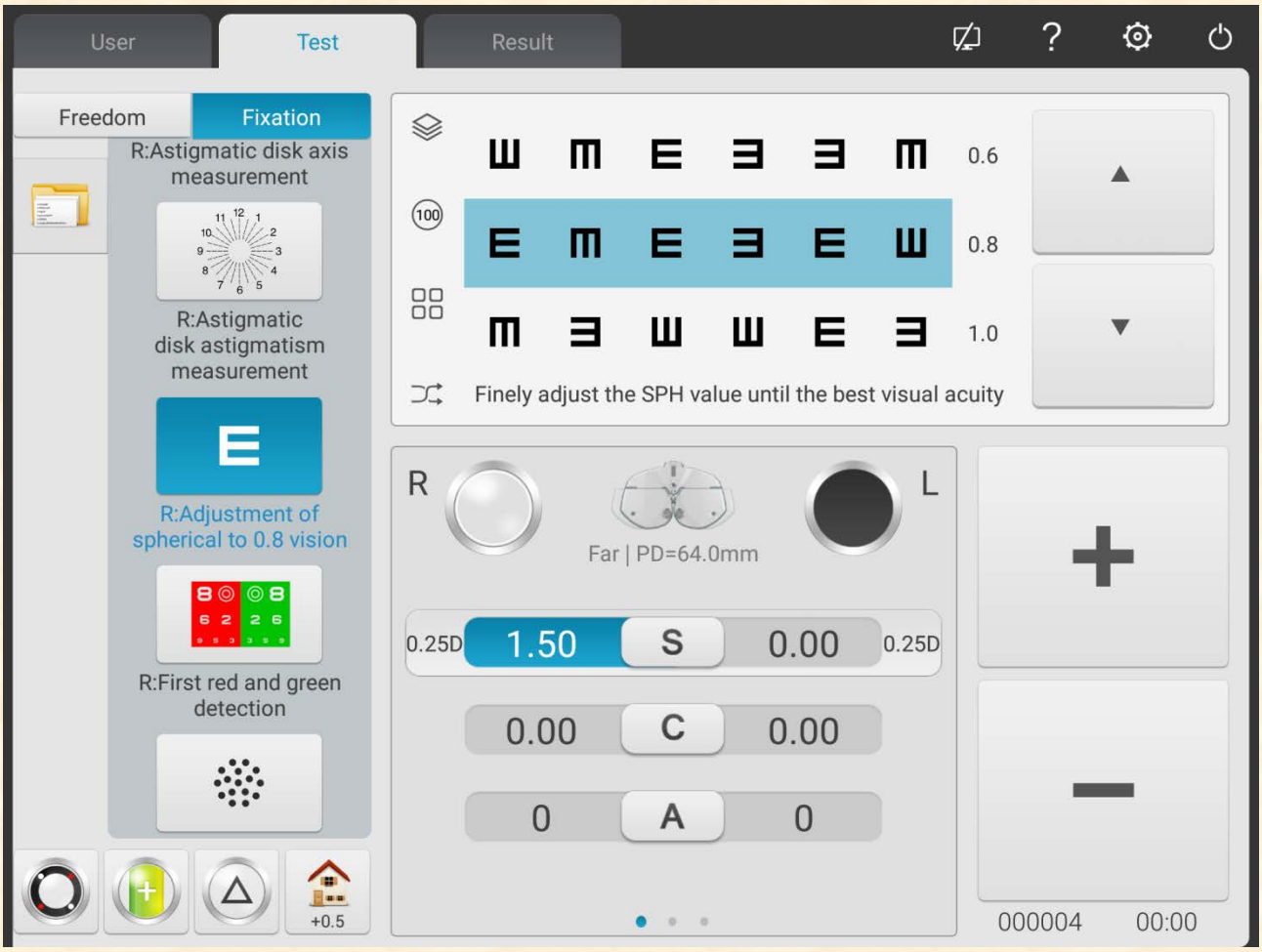
to test the astigmatic power with astigmatism disk.

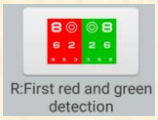
Take -0.25D cylinder as increment, gradually adjust the cylindrical power until the definitions of lines to all directions in the astigmatism disc are the same.



5. Press 

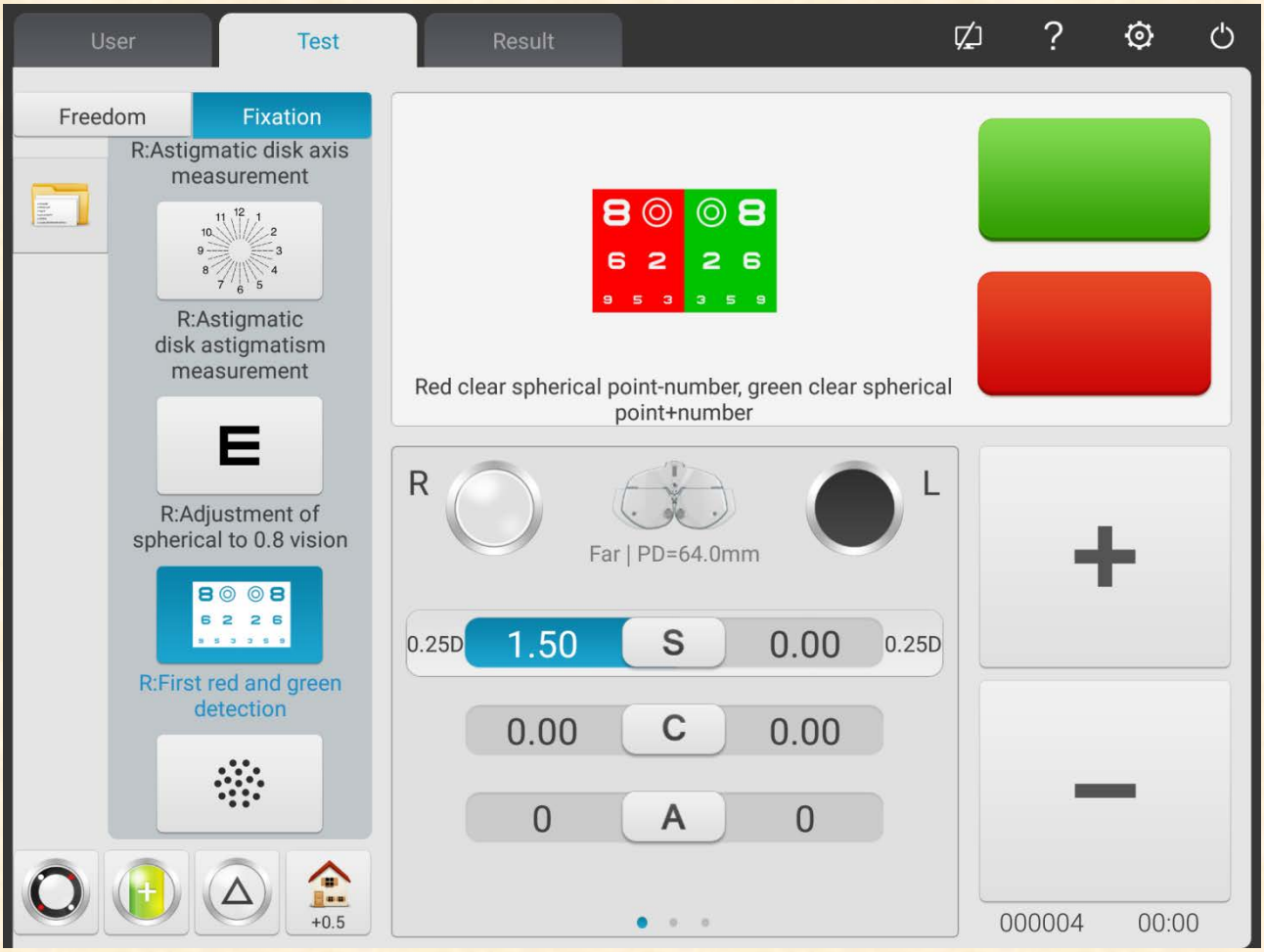
and call in 0.8 sighting mark, take -0.25D sphere as increment to gradually adjust the spherical power until the patient sees the sighting mark clearly.



6.Press 

to correct right eye spherical power with red and green sighting mark (first-time red and green test).

Call in spherical lens according to parameters settings. Call in red and green sighting marks.



1）Ask the patient: the letters in the red and green side of the sighting mark, which side looks more distinct?

If the letter in the red side looks more distinct: press “-” to increase -0.25D spherical power;

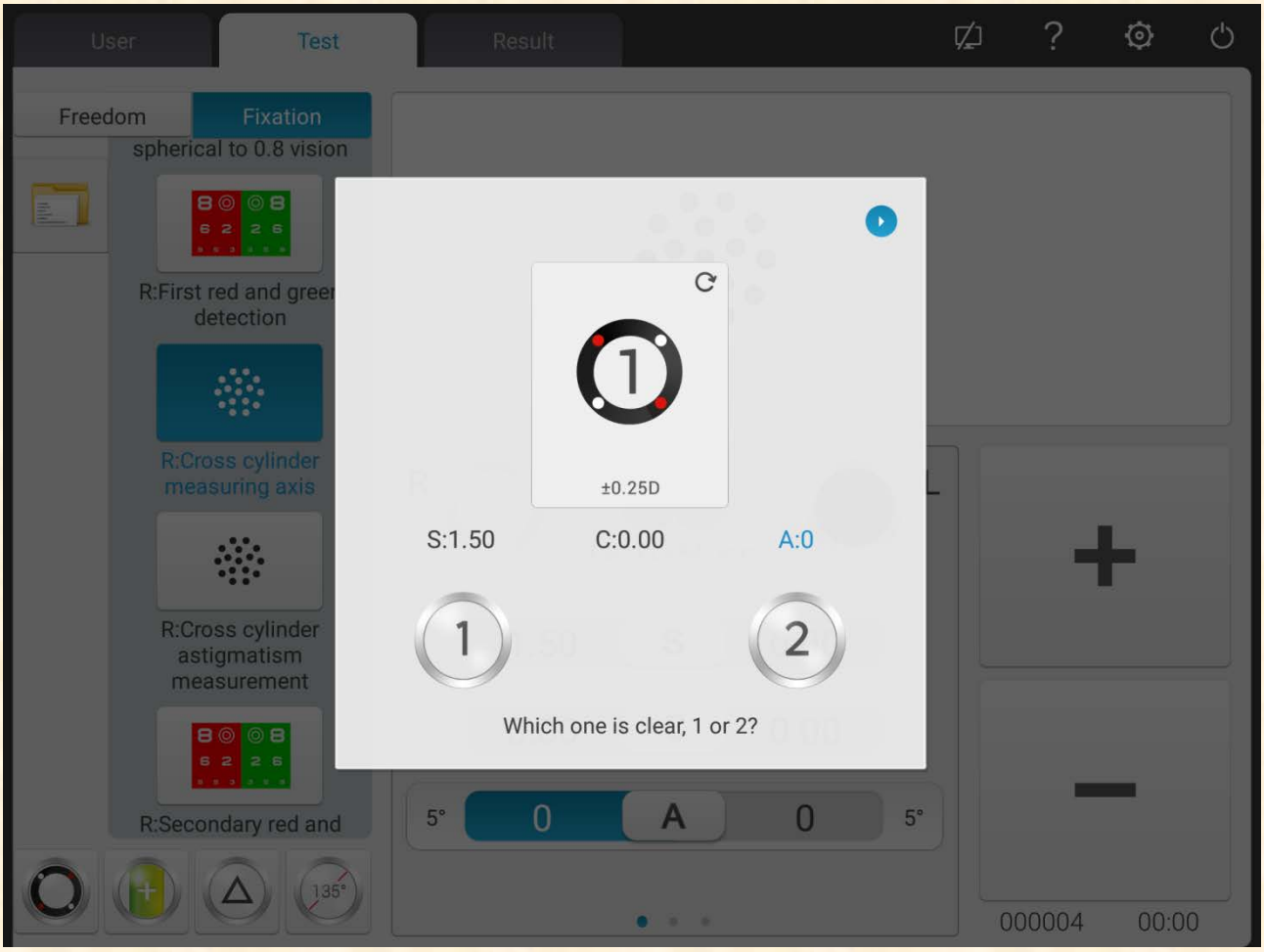
If the letter in the green side looks more distinct: press “+” to decrease -0.25D spherical power;

2）Repeat above steps until the definition of letters in the red side look the same as the definition of letters in the green side.

Attention: when the definitions of letters in the red and green side can not be adjusted consistent, make the letter in the red side more distinct.

7.Press

to make the crisscross cylinder accurately test the astigmatic axis of the right eye.

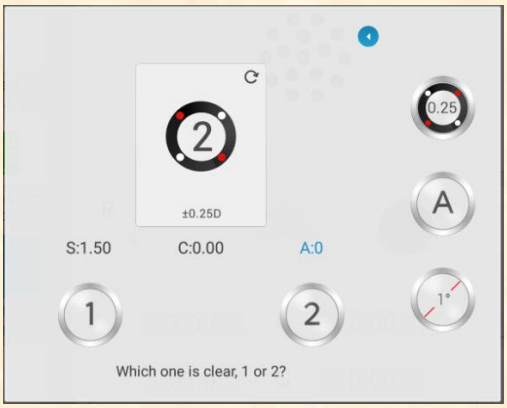


1）Call in speckle sighting mark and ±0.25D crisscross cylinder.

2）Reverse side 1 and side 2 of the crisscross cylinder, ask the patient: which side is more distinct?

When the side 1 is more distinct: enlarge the axis;

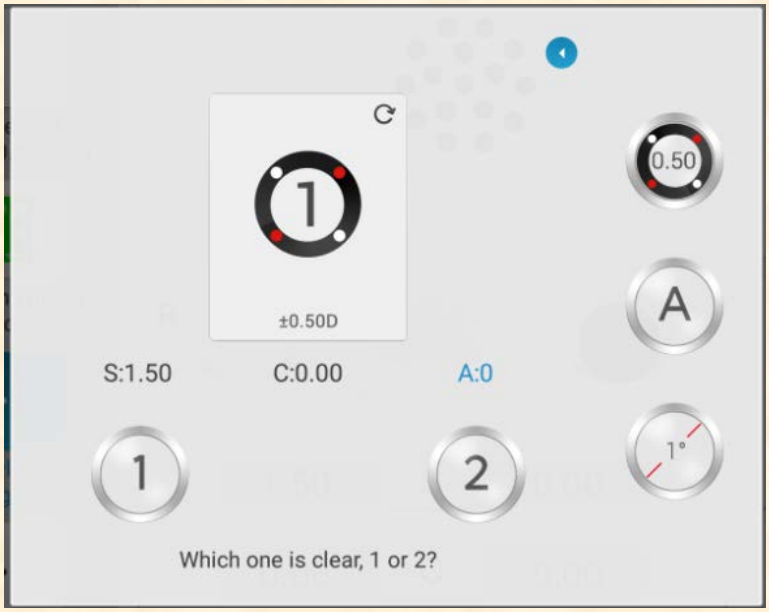
When the side 2 is more distinct: reduce the axis.



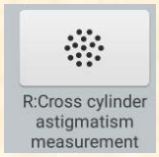
3）Repeat above steps until the definitions of side 1 and 2 look the same.

4）Click

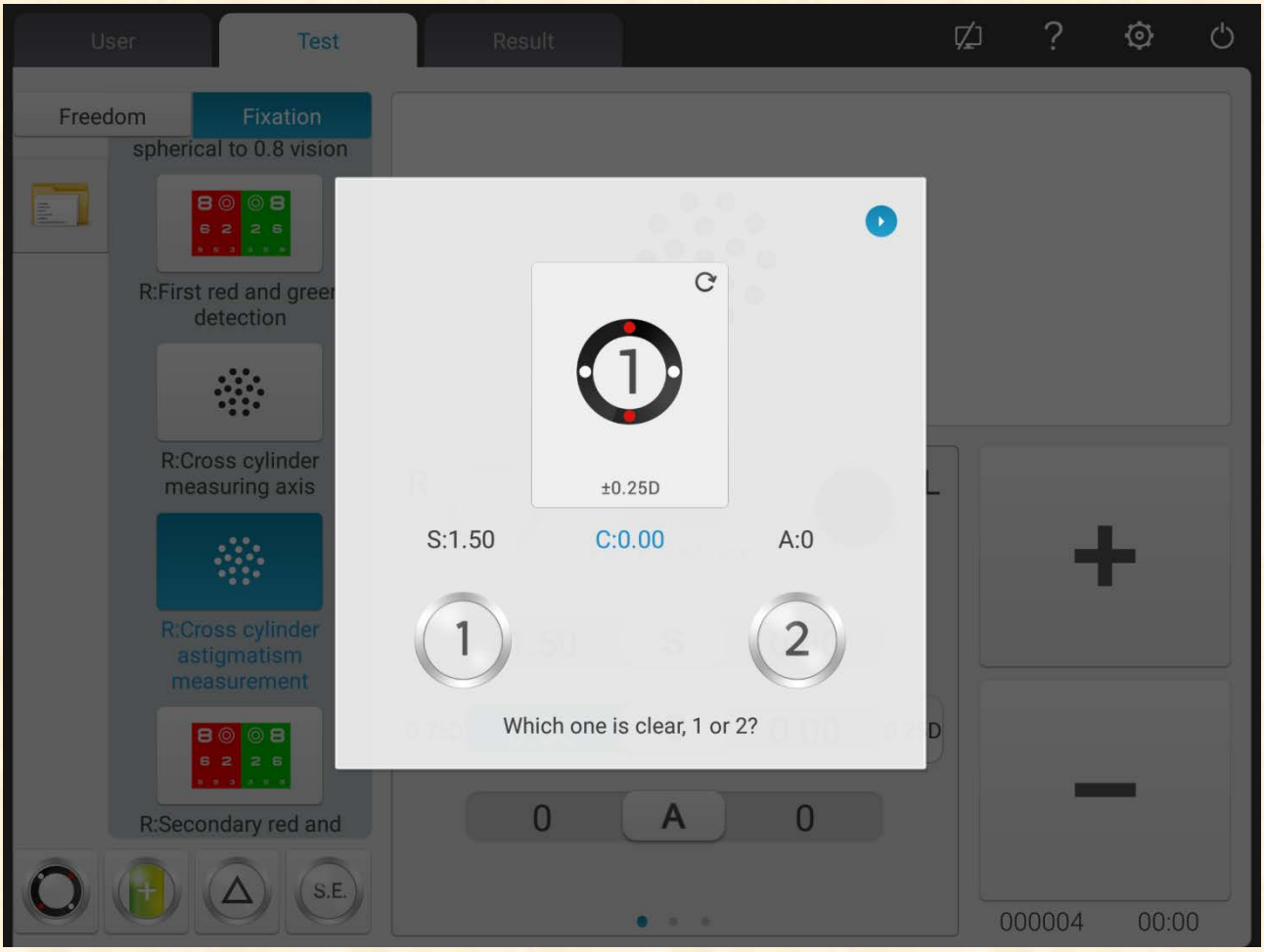
key， shift to 0.5XC.



5）Click the key again, shift to automatic mode(Slit Prism).

8. Press 

to make the crisscross cylinder accurately test the astigmatic power of the right eye.

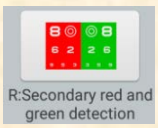


1）Reverse side 1 and side 2 of the crisscross cylinder, ask the patient: which side is more distinct?

When the side 1 is more distinct: enlarge the astigmatic power;

When the side 2 is more distinct: reduce the astigmatic power.

2）Repeat above steps until the definitions of side 1 and 2 look the same.

9.Press 

to correct right eye spherical power with red and green sighting mark (second-time red and green test).

1）According to parameter settings call in spherical lens. Call in red and green sighting marks.

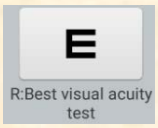
2）Ask the patient: the letters in the red and green side of the sighting mark, which side looks more distinct?

If the letter in the red side looks more distinct: press “-” to increase -0.25D spherical power;

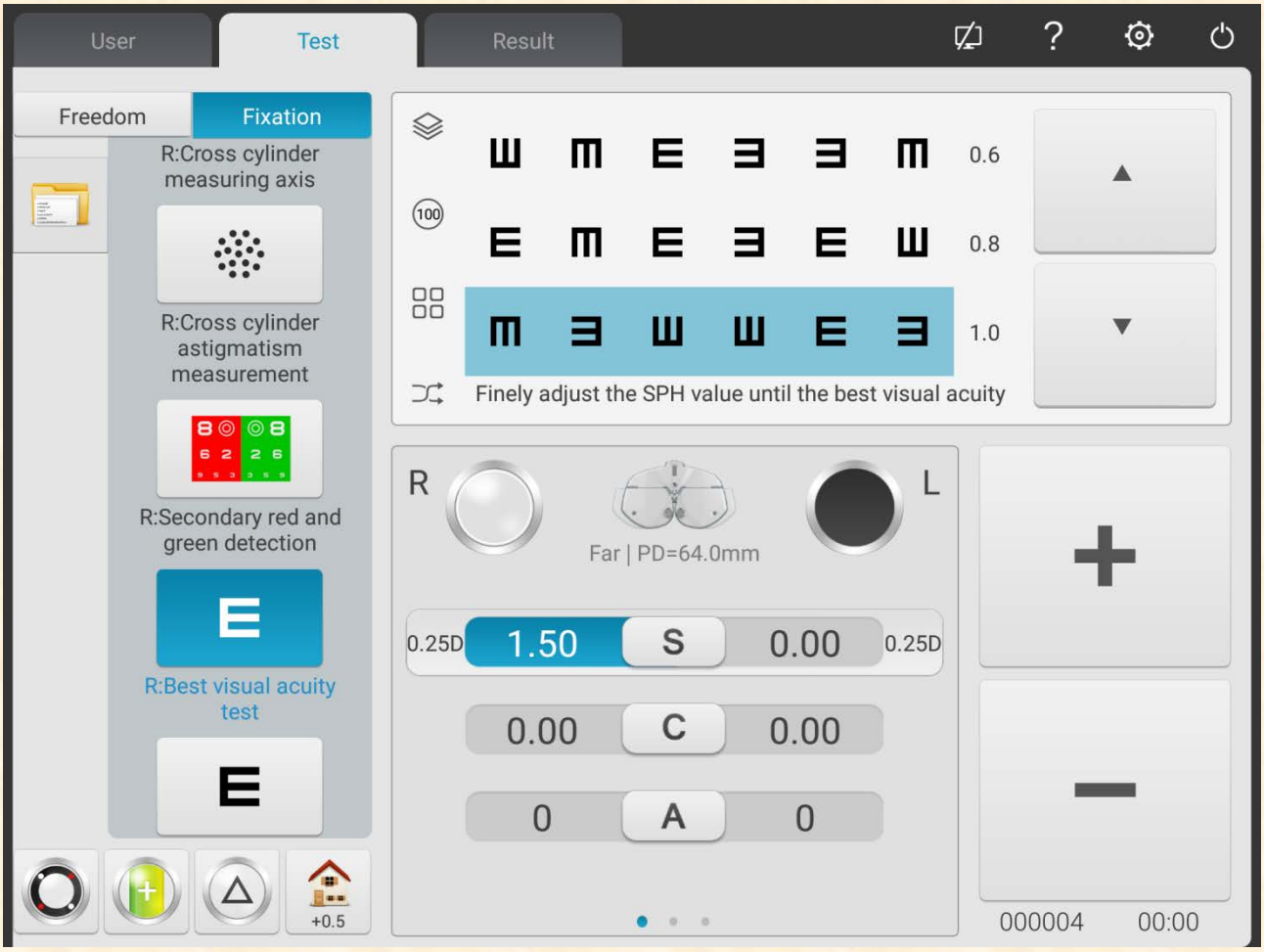
If the letter in the green side looks more distinct: press “+” to decrease -0.25D spherical power;

3）Repeat above steps until the definition of letters in the red side look the same as the definition of letters in the green side.

Attention: when the definitions of letters in the red and green side can not be adjusted consistent, make the letter in the red side more distinct.

10. Press 

to accurately adjust the spherical power to get the best vision of the right eye.

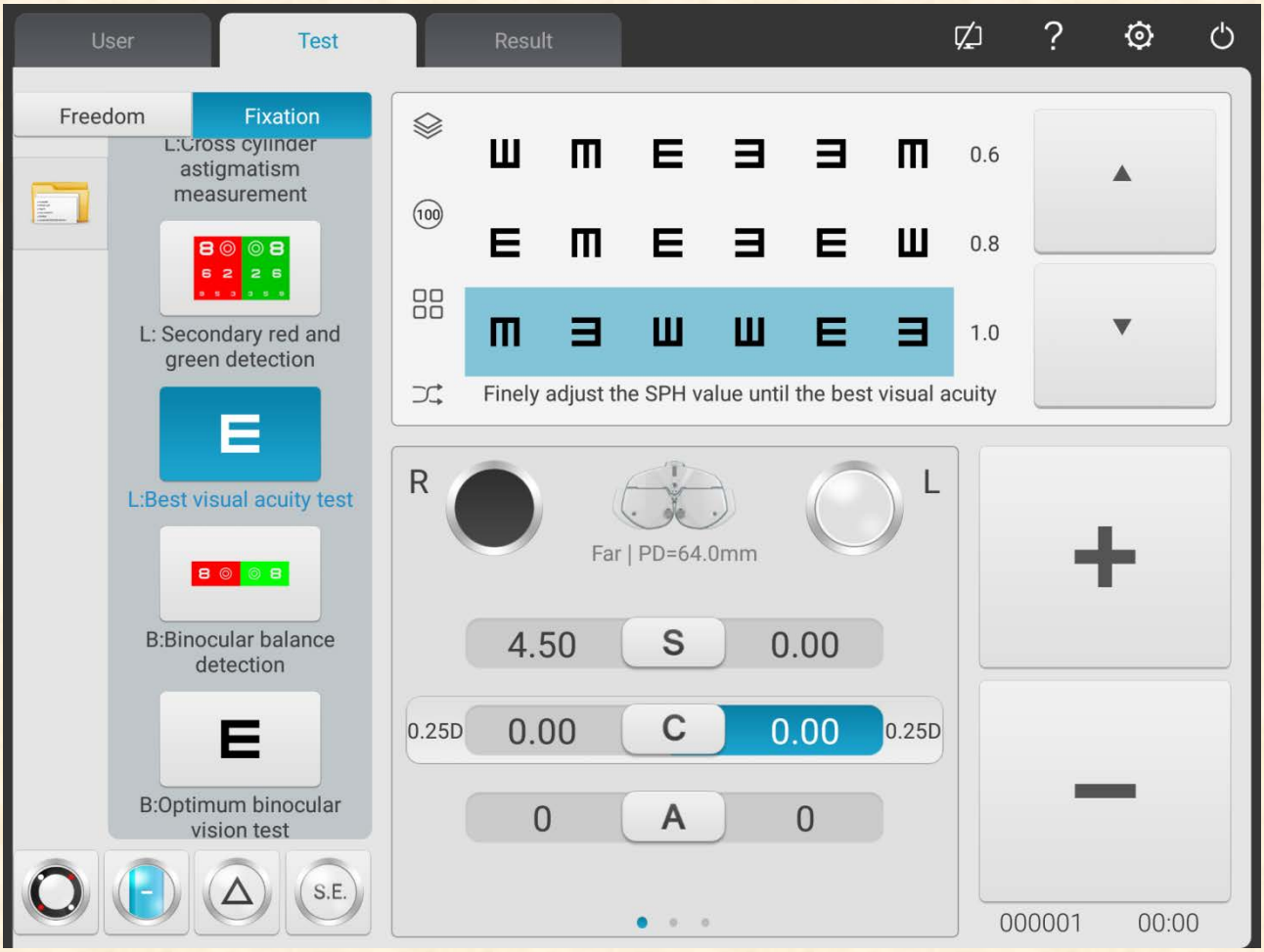


Call in 1.0 sighting mark. Adjust spherical power, and ask the patient to keep eyes on the sighting mark. Ask the patient when the sighting mark looks more distinct.

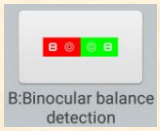
Take the lowest spherical power when the 1.0 sighting mark is clearly seen as the best vision of the right eye sphere.

So far, the SUBJ test for the right eye is finished.

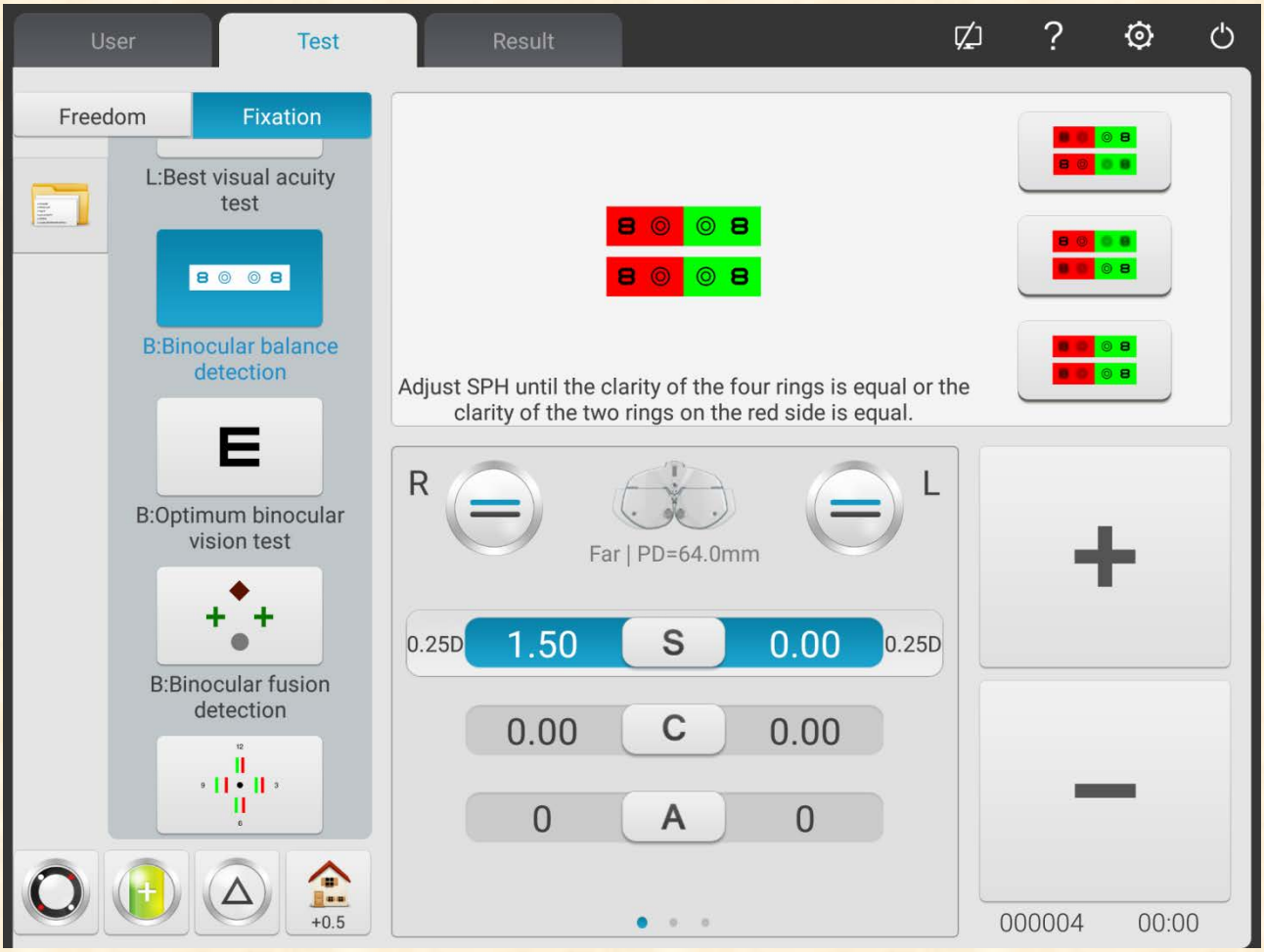
11～19. Test the best vision of the left eye according to above step 2~10.



So far, the SUBJ test for the left eye is finished.

20. Press 

to begin binocular equilibrium test (FINAL test)



1）Open R and L testing windows. Call in binocular balance sighting mark, and 3△ face-down prism for right eye and 3△ face-up prism for left eye.

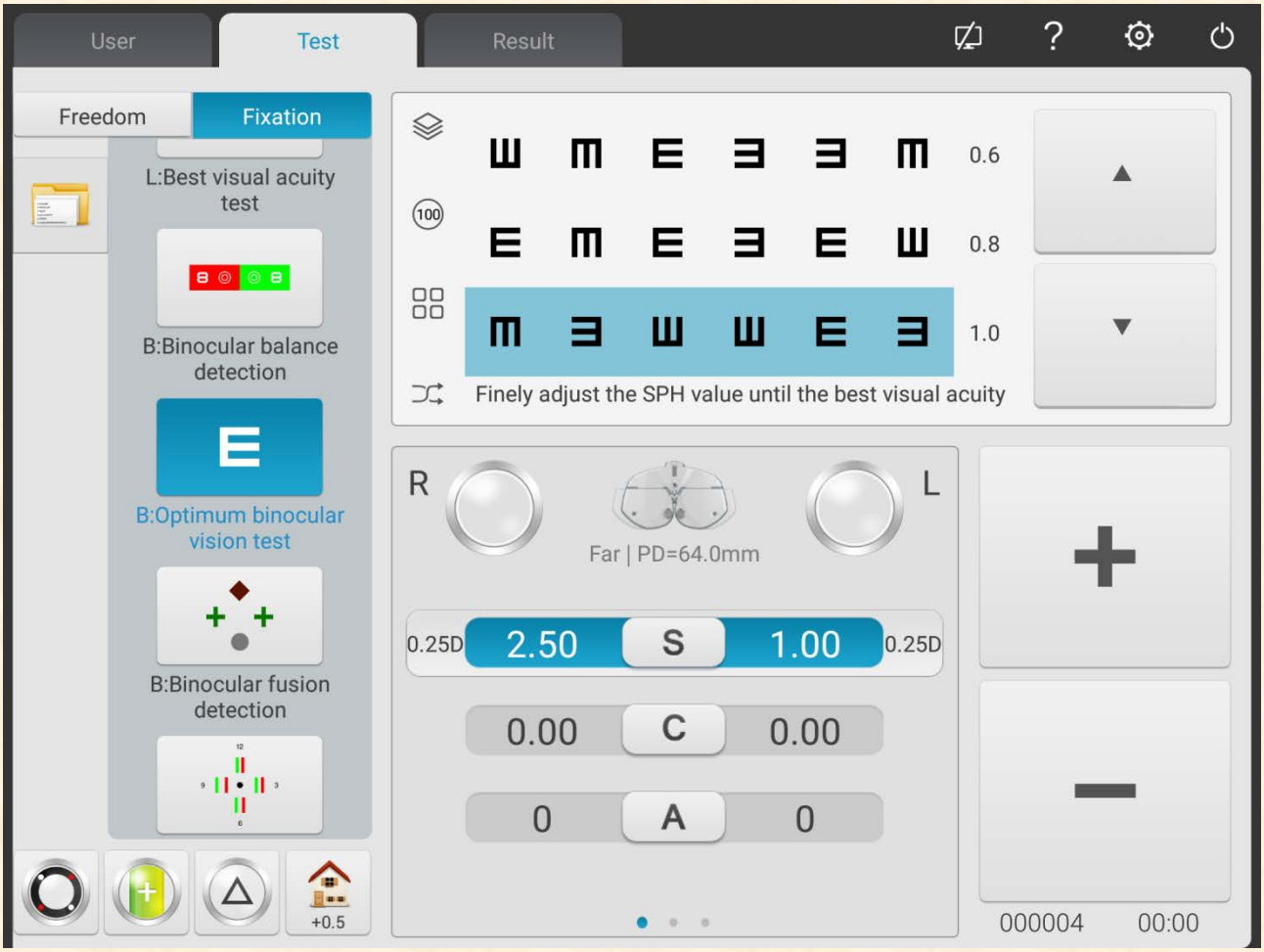
2） Ask the patients keep two eyes on the sighting mark and compare the definitions of upper and lower sighting marks.

If the upper sighting mark is more distinct than the lower sighting mark: press “+” to reduce -0.25D spherical power for the right eye;

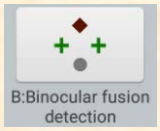
If the lower sighting mark is more distinct than the upper sighting mark: press “+” to reduce -0.25D spherical power for the left eye

3） Repeat above steps until the definitions of two sighting marks look the same.

21. Binocular best vision correction



Reduce the spherical powers of two eyes by -1.00D synchronically, remove the prism in the binocular testing window, call in 1.0 sighting mark; enlarge the spherical powers of two eyes by -0.25D synchronically until the 1.0 sighting mark is clearly seen by two eyes.

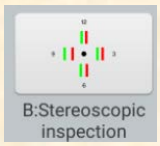
22. Press 

to begin Worth 4 dots test.

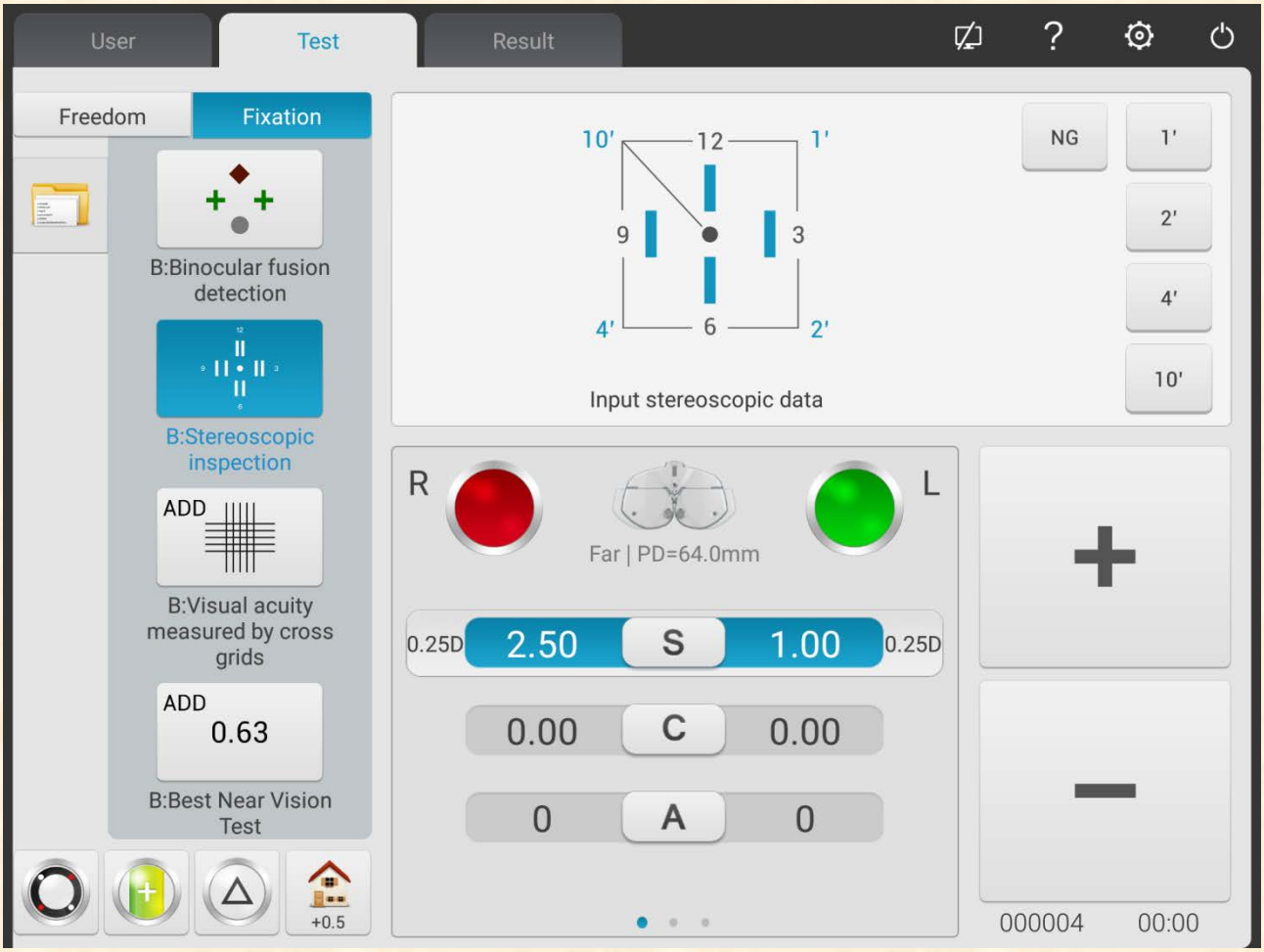
1）Call in red optical filter in R testing window and green optical filter in L testing window, and Worth 4 dots sighting mark.

2）Confirm which points the patient can see clearly.

3）Input the Worth 4 dots testing result.

23. Press 

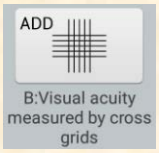
to begin stereopsis testing.



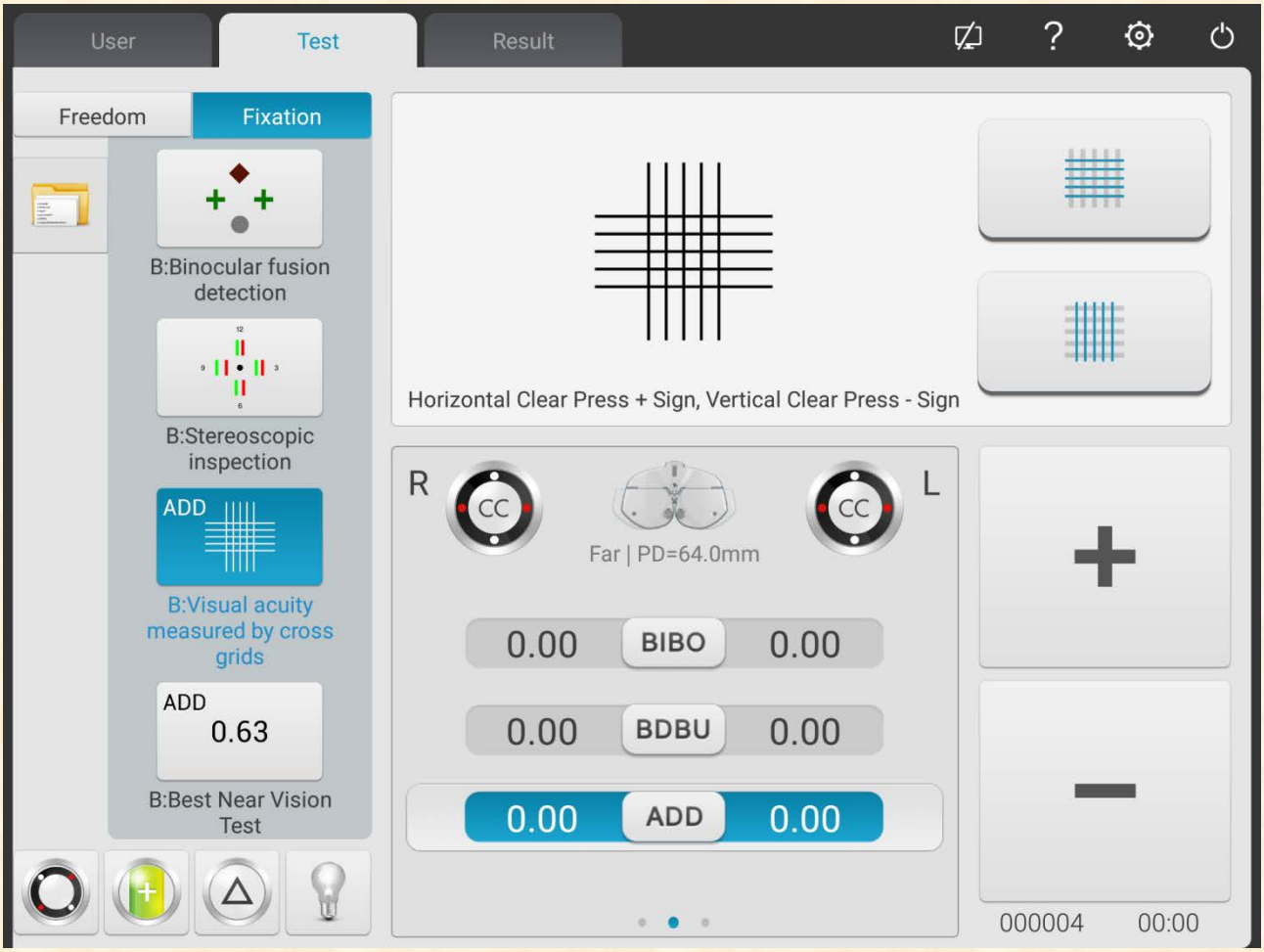
1）Call in red optical filter in R testing window and green optical filter in L testing window, and stereo sighting mark.

2）Confirm if the patient can see four straight lines with stereo clearly.

3）Input the stereoscopic parallax testing result.

24. Press 

to test additional degree



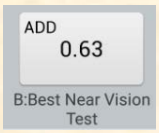
1）Lower down the short-distance vision rod and place the visual chart in necessary working distance (generally 400mm).

2）Select the crisscross matrix sighting mark on the short-distance visual chart.

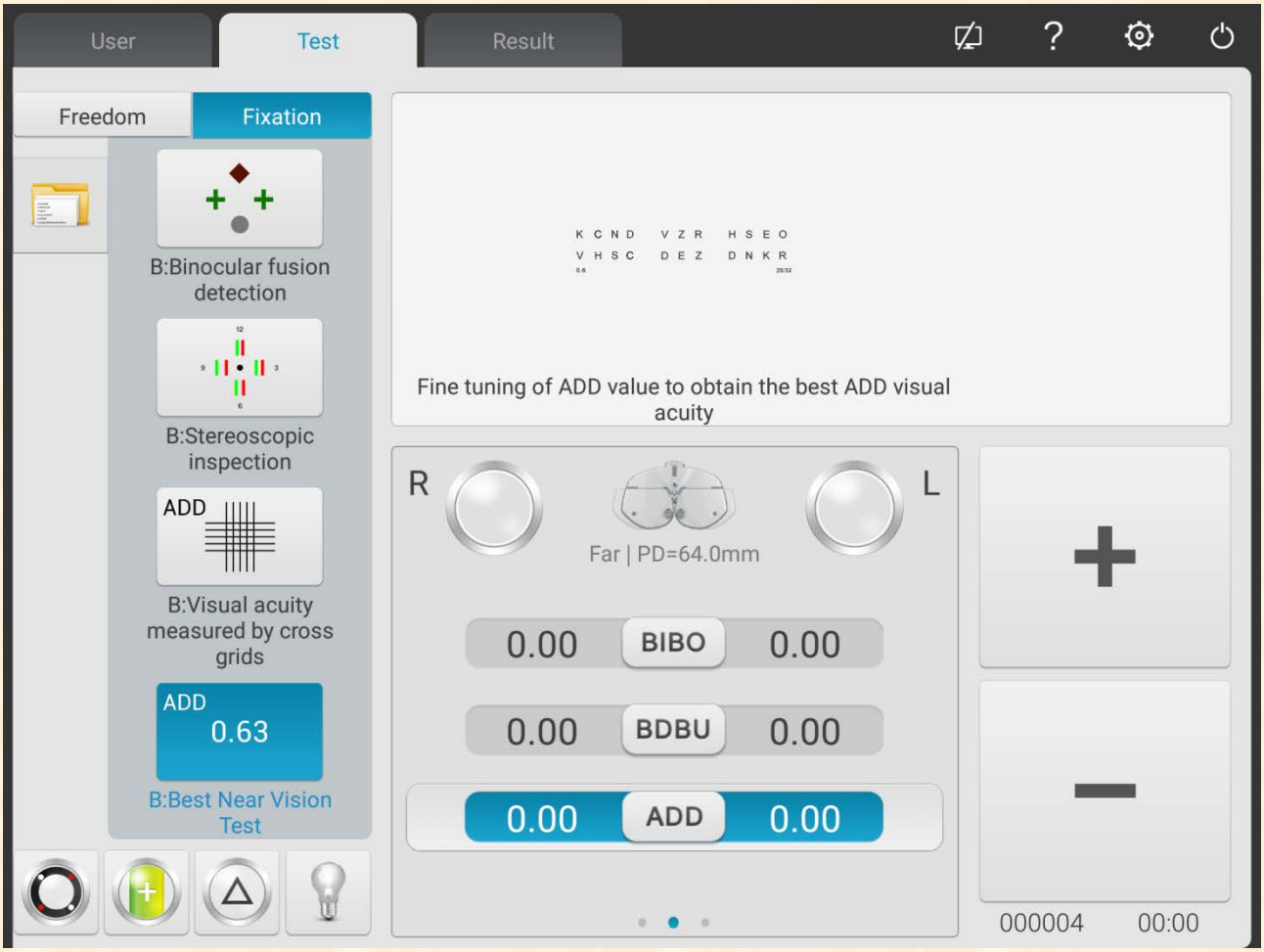
3）Ask the patient: the horizontal line or the vertical line, which is more distinct? Or the horizontal line and the vertical line look the same?

If the horizontal line and the vertical line look the same: there is no need to carry out near vision test and change the additional degree.

If the horizontal line is more distinct than the vertical line: increase two eyes by +0.25D additional degree synchronically until the horizontal line looks as distinct as the vertical line.

25. Press 

to carry out near vision test.



1）Remove ±0.50D fixed crisscross cylinder.

2）Select short-distance visual chart to test the vision.

3）Make the patient see the sighting mark clearly to reach ideal vision value.

5.5 Binocular Functional Testing Method

5.5.1 Crisscross matrix test (presbyopia)

Test purpose: to test the spherical power.

Test sighting mark: crisscross matric sighting mark

Assistant lens: binocular ±0.50D fixed crisscross cylinder

1. Binocular distant vision test is finished, add distant vision degree in the testing window.

2. Add binocular ±0.50D fixed crisscross cylinder.

3. Lower down the short-distance vision rod and place the visual chart in necessary working distance (generally 400mm).

4. Select the crisscross matrix sighting mark on the short-distance visual chart.

5. Ask the patient: the horizontal line or the vertical line, which is more distinct? Or the horizontal line and the vertical line look the same?

If the horizontal line and the vertical line look the same: there is no need to carry out near vision test and wear presbyopia glasses.

If the horizontal line is more distinct than the vertical line: increase two eyes by +0.25D additional degree synchronically until the horizontal line looks as distinct as the vertical line.

6. Remove ±0.50D fixed crisscross cylinder.

7. Select short-distance visual chart to test the vision and slightly adjust the sphere to make the patient see the sighting mark clearly to reach ideal vision value.

5.5.2 Cross test (heterophoria)

Test purpose: To test heterophoria

Test sighting mark: Cross sighting mark

Assistant lens: Binocular rotatory prime

Right eye red optical filter, left eye green optical filter (red and green cross sighting mark)

Binocular circular polarized optical filter (polarized cross sighting mark)

1. Call in cross sighting mark.

2. Ask the patient about the sighting mark he sees and test according his answers.

Sighting mark shape	Diagnosis	Correction
	No heterophoria	Align eye position, no need for correction.
	Esophoria	Increase BO prismatic power until it turns into a cross
	Exophoria	Increase BI prismatic power until it turns into a cross
	Left eye hyperphoria	Increase BU prismatic power in right eye and BD prismatic power in left eye until it turns into a cross
	Right eye hyperphoria	Increase BU prismatic power in left eye and BD prismatic power in right eye until it turns into a cross
	Esophoria + right eye hyperphoria	Correct the horizontal heterophoria according to esophoria method and correct the vertical heterophoria according to right eye heperphpria until it turns into a cross.
	Esophoria + left eye hypophoria	Correct the horizontal heterophoria according to esophoria method and correct the vertical heterophoria according to left eye heperphpria until it turns into a cross.
	Exophoria + right eye hyperphoria	Correct the horizontal heterophoria according to exophoria method and correct the vertical heterophoria according to right eye heperphpria until it turns into a cross.
	Exophoria + left eye hyperphoria	Correct the horizontal heterophoria according to exophoria method and correct the vertical heterophoria according to right eye heperphpria until it turns into a cross.

Note: When adding prismatic power, only add one eye's prismatic power instead of two eyes' prismatic powers.

5.5.3 Cross fixation vision test (heterophoria)

Test purpose: to test heterophoria

Test sighting mark: cross fixation sighting mark

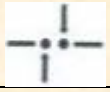
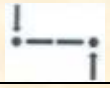
Assistant lens: Binocular rotatory prime

Right eye red optical filter, left eye green optical filter (red and green cross fixation sighting mark)

Binocular circular polarized optical filter (polarized cross fixation sighting mark)

1. Call in cross fixation sighting mark.

2.Ask the patient about the sighting mark he sees and test according his answers.

Sighting mark shape	Diagnosis	Correction
	No heterophoria	Align eye position, no need for correction.
	Esophoria	Increase BO prismatic power until it turns into a cross
	Exophoria	Increase BI prismatic power until it turns into a cross
	Left eye hyperphoria	Increase BU prismatic power in right eye and BD prismatic power in left eye until it turns into a cross
	Right eye hyperphoria	Increase BU prismatic power in left eye and BD prismatic power in right eye until it turns into a cross
	Esophoria + right eye hyperphoria	Correct the horizontal heterophoria according to esophoria method and correct the vertical heterophoria according to right eye heperphpria until it turns into a cross.
	Esophoria + left eye hypophoria	Correct the horizontal heterophoria according to esophoria method and correct the vertical heterophoria according to left eye heperphpria until it turns into a cross.
	Exophoria + right eye hyperphoria	Correct the horizontal heterophoria according to exophoria method and correct the vertical heterophoria according to right eye heperphpria until it turns into a cross.
	Exophoria + left eye hyperphoria	Correct the horizontal heterophoria according to exophoria method and correct the vertical heterophoria according to right eye heperphpria until it turns into a cross.

Note: When adding prismatic power, only add one eye's prismatic power instead of two eyes' prismatic powers.

5.5.4 Cross ring test (heterophoria)

Test purpose: to test heterophoria

Test sighting mark: cross ring sighting mark

Assistant lens: Binocular rotatory prime

Right eye red optical filter, left eye green optical filter (red and green cross ring sighting mark)

Binocular circular polarized optical filter (polarized cross ring sighting mark)

1. Call in cross ring sighting mark.

2. Ask the patient about the sighting mark he sees and test according his answers.

Sighting mark shape	Diagnosis	Correction
	No heterophoria	Align eye position, no need for correction.
	Esophoria	Increase BO prismatic power until it the cross goes in the center of the circle.
	Exophoria	Increase BI prismatic power until it the cross goes in the center of the circle.
	Left eye hyperphoria	Increase BU prismatic power in right eye and BD prismatic power in left eye until it the cross goes in the center of the circle.
	Right eye hyperphoria	Increase BU prismatic power in left eye and BD prismatic power in right eye until it the cross goes in the center of the circle.

Note: When adding prismatic power, only add one eye's prismatic power instead of two eyes' prismatic powers.

5.5.5 Horizontal coincidence test (horizontal image inequality and horizontal heterophoria)

Test purpose: to test horizontal image inequality and horizontal heterophoria

Test sighting mark: horizontal coincidence sighting mark

Assistant lens: Binocular rotatory prime

Right eye red optical filter, left eye green optical filter (red and green horizontal coincidence sighting mark)

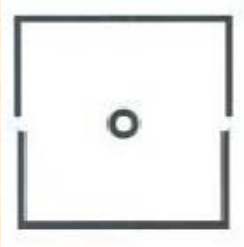
Binocular circular polarized optical filter (polarized horizontal coincidence sighting mark)

1. Call in horizontal coincidence sighting mark.

2. Ask the patient about the sighting mark he sees and test according his answers.

2.1 Horizontal image inequality

If the sizes of the upper and lower frames are equivalent, there is no horizontal image inequality; if the sizes of the upper and lower frames are inequivalent, there is horizontal image inequality.



As shown in right figure: about 3.5 image inequality.

The straight line width of the sighting mark amounts to 3.5% image inequality.

2.2 Horizontal heterophoria

Sighting mark shape	Diagnosis	Correction
	No heterophoria	Align eye position, no need for correction.
	Esophoria	Increase BO prismatic power until it the upper frame aligns at the lower frame.
	Exophoria	Increase BI prismatic power until it the upper frame aligns at the lower frame.

Note: When adding prismatic power, only add one eye's prismatic power instead of two eyes' prismatic powers.

5.5.6 Vertical coincidence test (vertical image inequality and vertical heterophoria)

Test purpose: to test vertical image inequality and vertical heterophoria

Test sighting mark: vertical coincidence sighting mark

Assistant lens: Binocular rotatory prime

Right eye red optical filter, left eye green optical filter (red and green vertical coincidence sighting mark)

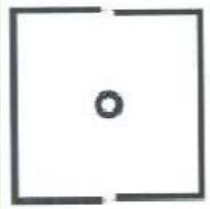
Binocular circular polarized optical filter (polarized vertical coincidence sighting mark)

1. Call in vertical coincidence sighting mark.

2. Ask the patient about the sighting mark he sees and test according his answers.

2.1 Vertical image inequality

If the sizes of the upper and lower frames are equivalent, there is no vertical image inequality; if the sizes of the upper and lower frames are not equivalent, there is vertical image inequality.



As shown in right figure: about 3.5 image inequality.

The straight line width of the sighting mark amounts to 3.5% image inequality.

2.2 Vertical heterophoria

Sighting mark shape	Diagnosis	Correction
	No heterophoria	Align eye position, no need for correction.
	Right eye hyperphoria	Increase BU prismatic power in left eye and BD prismatic power in right eye until it the left frame aligns at the right frame.
	Left eye hyperphoria	Increase BU prismatic power in right eye and BD prismatic power in left eye until it the left frame aligns at the right frame.

Note: When adding prismatic power, only add one eye's prismatic power instead of two eyes' prismatic powers.

5.5.7 Horizontal Maddox rod test (horizontal heterphoria)

Test purpose: to test horizontal heterophoria

Test sighting mark: Maddox rod sighting mark

Assistant lens: right eye horizontal Maddox rod, left eye rotatory prism

1. Call in Maddox rod sighting mark.

2. Ask the patient about the sighting mark he sees and test according his answers.

Sighting mark shape	Diagnosis	Correction
	No heterophoria	Align eye position, no need for correction.
	Esophoria	Increase BO prismatic power for left eye until the white point coincides with the straight line.
	Exophoria	Increase BI prismatic power for left eye until the white point coincides with the straight line.

Note: When adding prismatic power, only add one eye's prismatic power instead of two eyes' prismatic powers.

5.5.8 Horizontal Maddox rod test (horizontal heterphoria)

Test purpose: to test horizontal heterophoria

Test sighting mark: Maddox rod sighting mark

Assistant lens: right eye horizontal Maddox rod, left eye rotatory prism

1. Call in Maddox rod sighting mark.

2. Ask the patient about the sighting mark he sees and test according his answers.

Sighting mark shape	Diagnosis	Correction
	No heterophoria	Align eye position, no need for correction.
	Left eye hyperphoria	Increase BU prismatic power in right eye and BD prismatic power in right eye until the white point coincides with the straight line.
	Right eye hyperphoria	Increase BU prismatic power in right eye and BD prismatic power in left eye until the white point coincides with the straight line.

Note: When adding prismatic power, only add one eye's prismatic power instead of two eyes' prismatic powers.

5.5.9 Clock test (rotatory heterophoria)

Test purpose: to test rotatory heterophoria

Test sighting mark: clock sighting mark

Assistant lens: Binocular rotatory prime

Right eye red optical filter, left eye green optical filter (red and green clock sighting mark)

Binocular circular polarized optical filter (polarized clock sighting mark)

1.Call in clock sighting mark.

2. Ask the patient about the sighting mark he sees and test according his answers.

Sighting mark shape	Diagnosis	Correction
	No rotatory heterophoria	Align eye position, no need for correction.
	Idiopathic rotatory heterophoria	Functional rotatory heterophoria, can’t be corrected with glasses
	Optical rotatory heterophoria	It might be caused by oblique astigmatism of human eyes or oblique cylinder of glasses. Make appropriate adjustment of cylindrical axil and power.

5.5.10 Worth 4 dot test

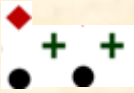
Test purpose: to test binocular fusion, suppression and dominant eye.

Test sighting mark: Worth 4 dots sighting mark

Assistant lens: Right eye red optical filter, left eye green optical filter

1. Call in Worth 4 dots sighting mark.

2. Ask the patient about the sighting mark he sees and test according his answers.

Dot number	Sighting mark shape	Description	Diagnosis
4		Red squares and round dots, green crosses	Two eyes have fusion function Right eye is dominant eye
4		Red squares, green crosses and round dots	Two eyes have fusion function Left eye is dominant eye
3		Green squares and round dots	Right eye suppression
2		Red squares and round dots	Left eye suppression
5		Five points are seen at the same time	Diplopia
5	Flicker alternately	Two red points and three green points flicker alternately	Alternate suppression

3. Input the testing results.

5.5.11 Stereopsis

Test purpose: to test stereopsis

Test sighting mark: stereo sighting mark

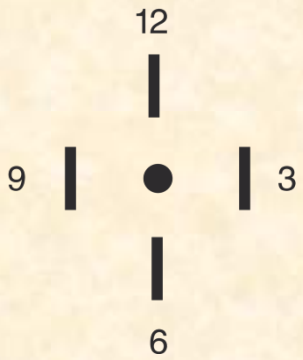
Assistant lens: Right eye red optical filter, left eye green optical filter (red and green stereo sighting mark)

Binocular circular polarized optical filter (polarized stereo sighting mark)

1. Call in stereo sighting mark.

2. Ask the patient about the sighting mark he sees and test according his answers.

Marks in normal eyes during test: figure 12, 3, 6, 9 and the central round point are at the same plane, and four short lines protrude outwards; the distances from the short line aside figure 12, 3, 6 and 9 to the eye are seemly shortened, and the short line aside figure 9 is the nearest.



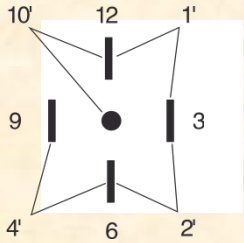
The stereoscopic parallaxes of all line are as follows:

The stereoscopic parallax between the short line aside figure 12 and the central round point is 10′;

The stereoscopic parallax between the short line aside figure 12 and figure 3 is 1′;

The stereoscopic parallax between the short line aside figure 3 and figure 6 is 2′;

The stereoscopic parallax between the short line aside figure 6 and figure 9 is 4′.



3. Input the testing results.

5.5.12 Divergence test

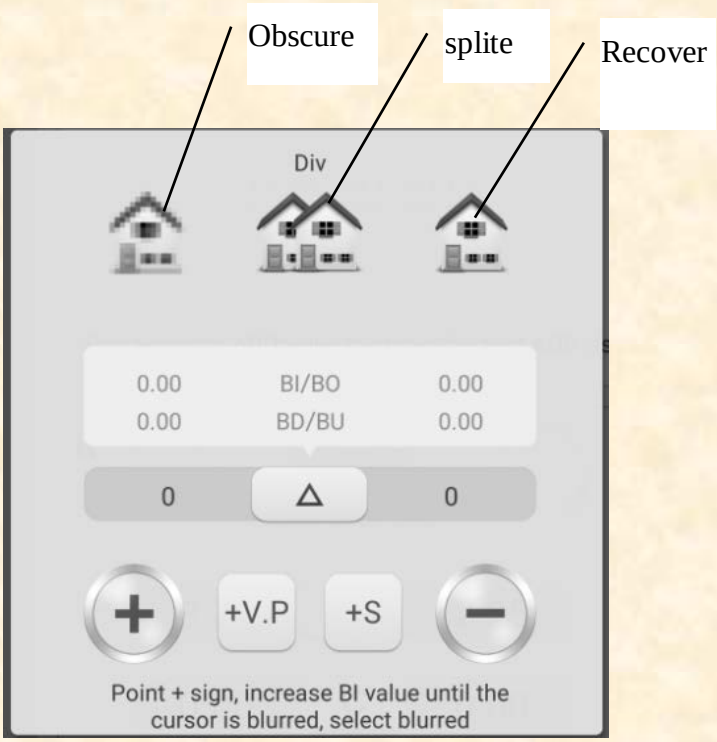
Test purpose: to test the eyes' congregation capability

Test sighting mark: the column sighting marks in the visual chart

Assistant lens: binocular rotatory prism

1.Under prism mode，presss

2. Press to enter divergence test.



3. Call in the sighting marks and display column sighting marks.

4. Increase BI prismatic power of two eyes until the sighting mark becomes obscure. Press the obscure icon, and it is highlighted, then save the prismatic power of the obscure point.

5. Increase BI prismatic power of two eyes until the sighting mark splits into two. Press the split icon, and it is highlighted, then save the prismatic power of the split point.

6. Increase BI prismatic power of two eyes until the sighting mark recovers as one. Press the recover icon, and it is highlighted, then save the prismatic power of the recover point.

5.5.13 Congregation test

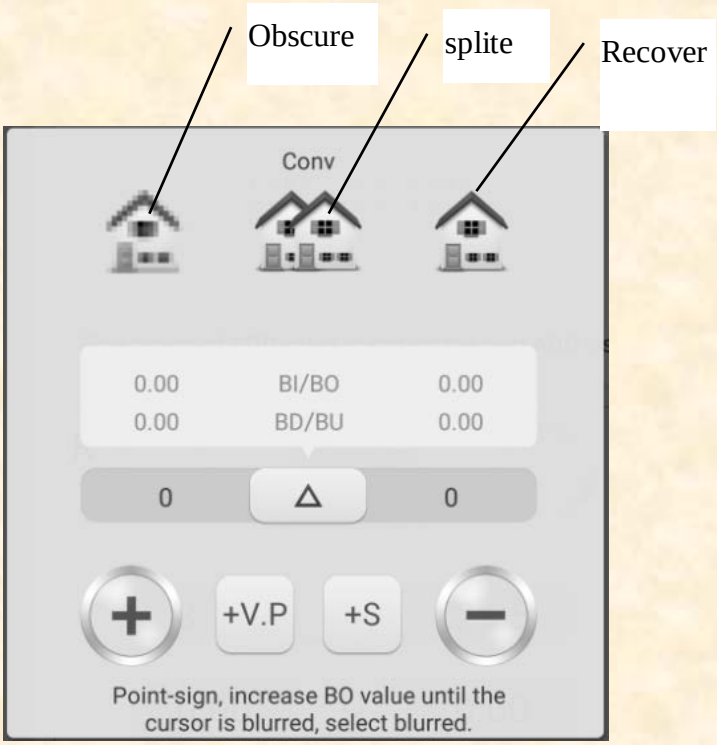
Test purpose: to test the eyes' congregation capability

Test sighting mark: the column sighting marks in the visual chart

Assistant lens: binocular rotatory prism

1.Under prism mode， presss

2. Press to enter congregation test.



3.Call in the sighting marks and display column sighting marks.

4. Increase BO prismatic power of two eyes until the sighting mark becomes obscure. Press the obscure icon, and it is highlighted, then save the prismatic power of the obscure point.

5. Increase BO prismatic power of two eyes until the sighting mark splits into two. Press the split icon, and it is highlighted, then save the prismatic power of the split point.

6. Increase BO prismatic power of two eyes until the sighting mark recovers as one. Press the recover icon, and it is highlighted, then save the prismatic power of the recover point.

5.5.14 Near –point congregation (NPC) test

No vision tester is needed in the test. If the patient wears glasses, do not take them off.

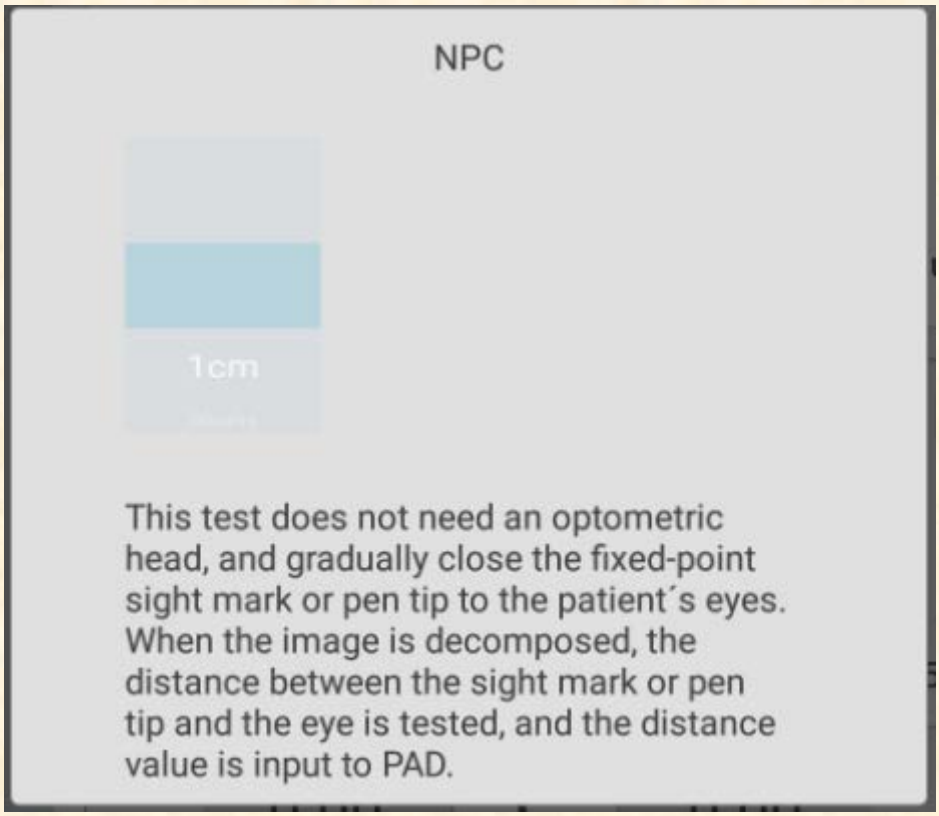
Test purpose: to test split point

Test sighting mark: cross fixation sighting mark, or nib that can easily cause diplopia.

1. Press

2. Press

to enter NPC test.



3. Put the nib in the right front of the patient and make the patient keep eyes on the nib.

4. Move the nib gradually to approach to the patient’s eyes: when the patient sees the nib becomes two from one, stop moving the nib.

5. Measure the distance from the nib to the nose root of the patient.

6. Input the distance (in cm) into the input frame, the meter angle and prismatic power will be calculated automatically.

5.5.15 Near –point adjustment (NPA) test

Test purpose: to test near-point adjustment

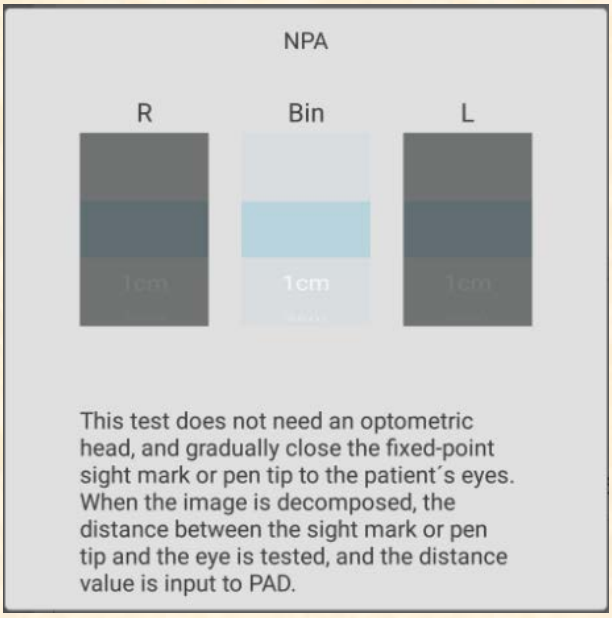
Test sighting mark: Letter sighting mark of short-distance visual chart.

Confirmation before test: Set “SPH distant vision → near vision” to SPH+ADD.

1. Press

2. Press

to enter NPA test.



3. Place the visual chart in the distance of 40cm, make sure the patient see clearly the letter sighting mark with best vision.

4. Move the visual chart gradually to approach to the patient’s eyes: when the sighting mark becomes obscure, stop moving the visual chart.

5. Measure the distance from the visual chart to the nose root of the patient.

6. Input the distance (in cm) into the input frame, the near-point adjustment value will be calculated automatically.

5.5.16 Negative-relative adjustment (NRA) test

Test purpose: to test the negative-relative adjustment when the two eyes congregate in specified working distance

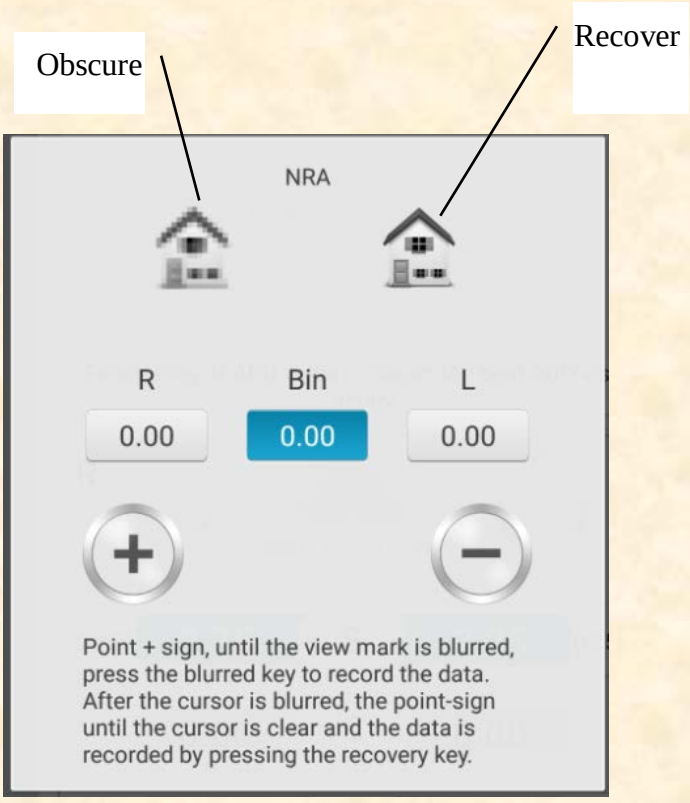
Test sighting mark: column sighting marks in short-distance visual chart

Confirmation before test: Set “SPH distant vision → near vision” to SPH+ADD.

1. Press

2. Press

to enter NRA test.



3.Place the visual chart in the distance of 40cm, make sure the patient see clearly the column sighting marks.

4.Press “+” and “-” to gradually adjust the spherical power until the sighting mark becomes obscure. Press the obscure icon, and it is highlighted, then save the spherical power of the obscure point.

5. Press “+” and “-” to gradually adjust the spherical power until the sighting mark becomes distinct again. Press the recover icon, and it is highlighted, then save the spherical power of the recover point.

5.5.17 Positive-relative adjustment (PRA) test

Test purpose: to test the positive-relative adjustment when the two eyes congregate in specified working distance

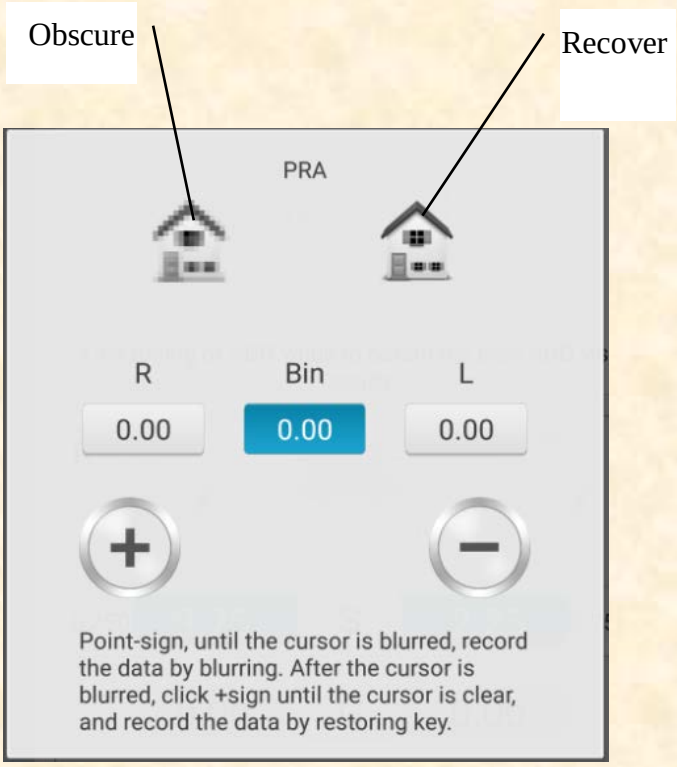
Test sighting mark: row sighting marks in short-distance visual chart

Confirmation before test: Set “SPH distant vision → near vision” to SPH+ADD.

1. Press

2. Press

to enter PRA test.



3.Place the visual chart in the distance of 40cm, make sure the patient see clearly the row sighting marks.

4.Press “+” and “-” to gradually adjust the spherical power until the sighting mark becomes obscure. Press the obscure icon, and it is highlighted, then save the spherical power of the obscure point.

5. Press “+” and “-” to gradually adjust the spherical power until the sighting mark becomes distinct again. Press the recover icon, and it is highlighted, then save the spherical power of the recover point.

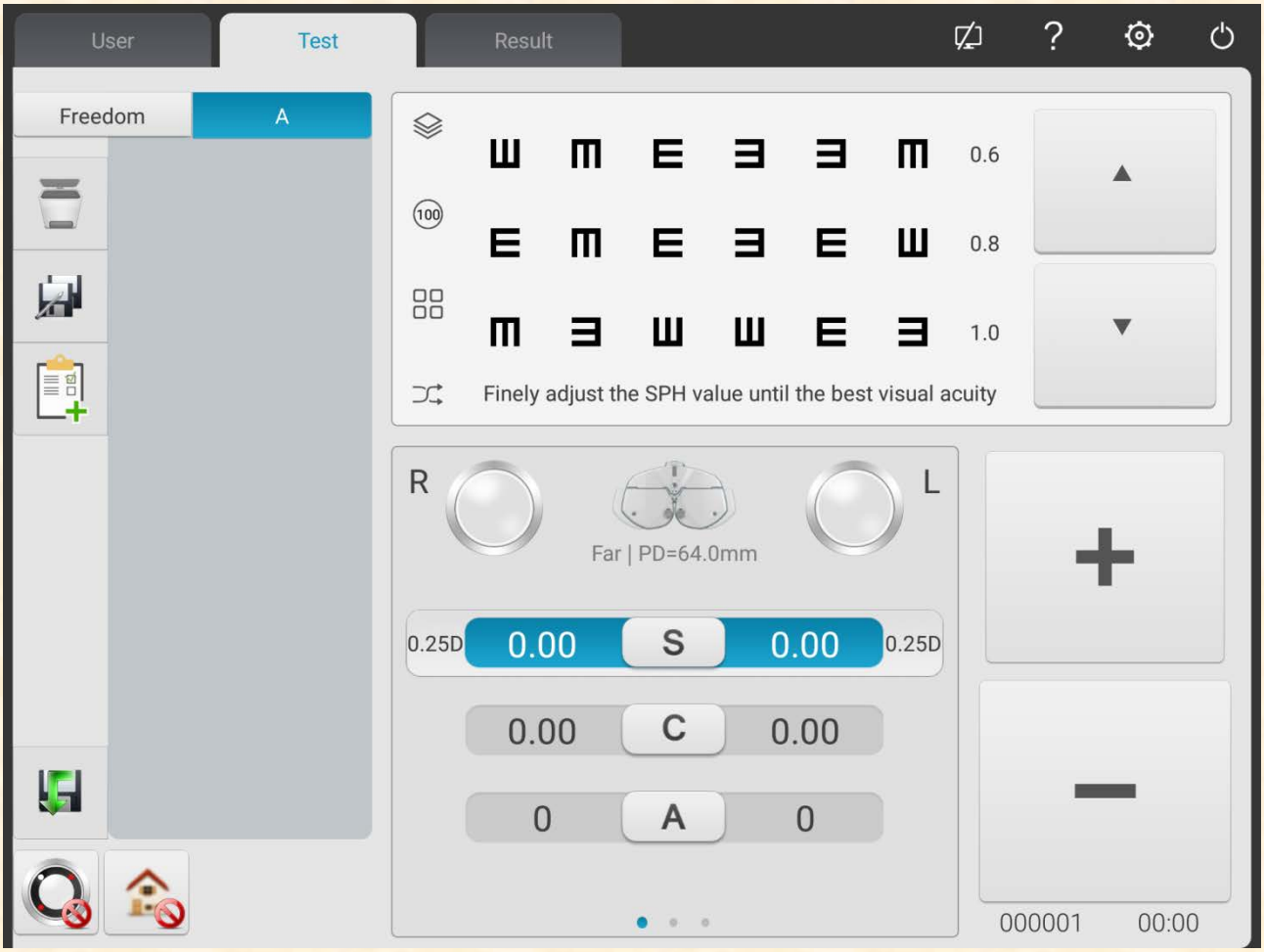
5.6 Customer Self-compiled program

This device has standard optometric fixed programs as factory default settings. There are 6 customer self-compiled optometric programs.

5.6.1 Self-programming

1. Press button on the left side of testing interface and enter optometric programs selecting interface, where 6 editable sets of programs (A,B,C,D,E,F) can be selected.

2.Select “gear” and enter customer self-programming interface.



3. Introduction of buttons

Button Clear: delete the current step

Button Add: adding step

Button Edit: edit the current step

4.After programming press button to automatically save self-compiled program, exit self-compiled program interface and return to the main interface.

5.6.2 Program running

1.Press button in the testing interface.

2.Click on the required program. For example, select program A.

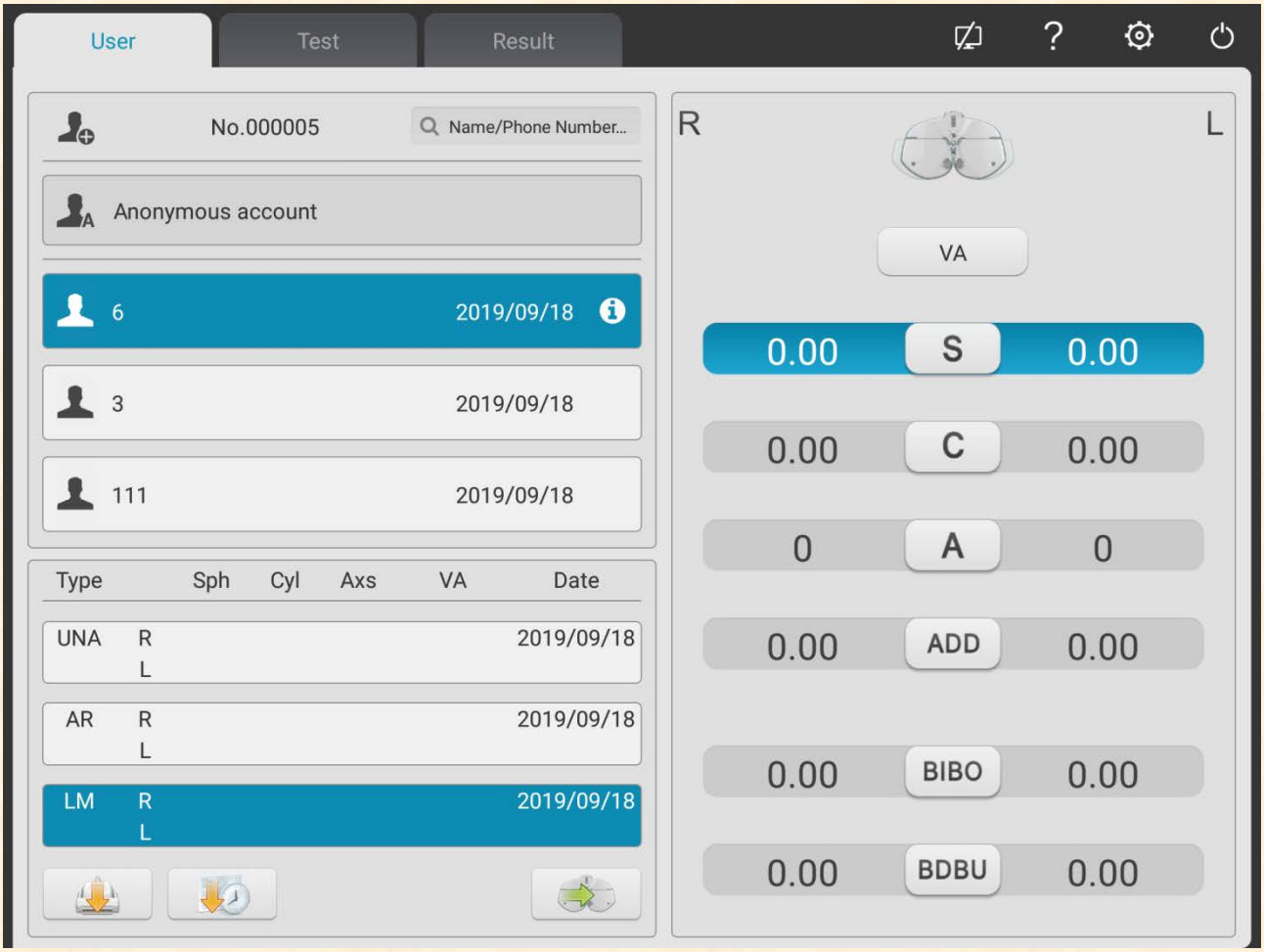
3.Self-compiled program starts to run.

5.7 Communication

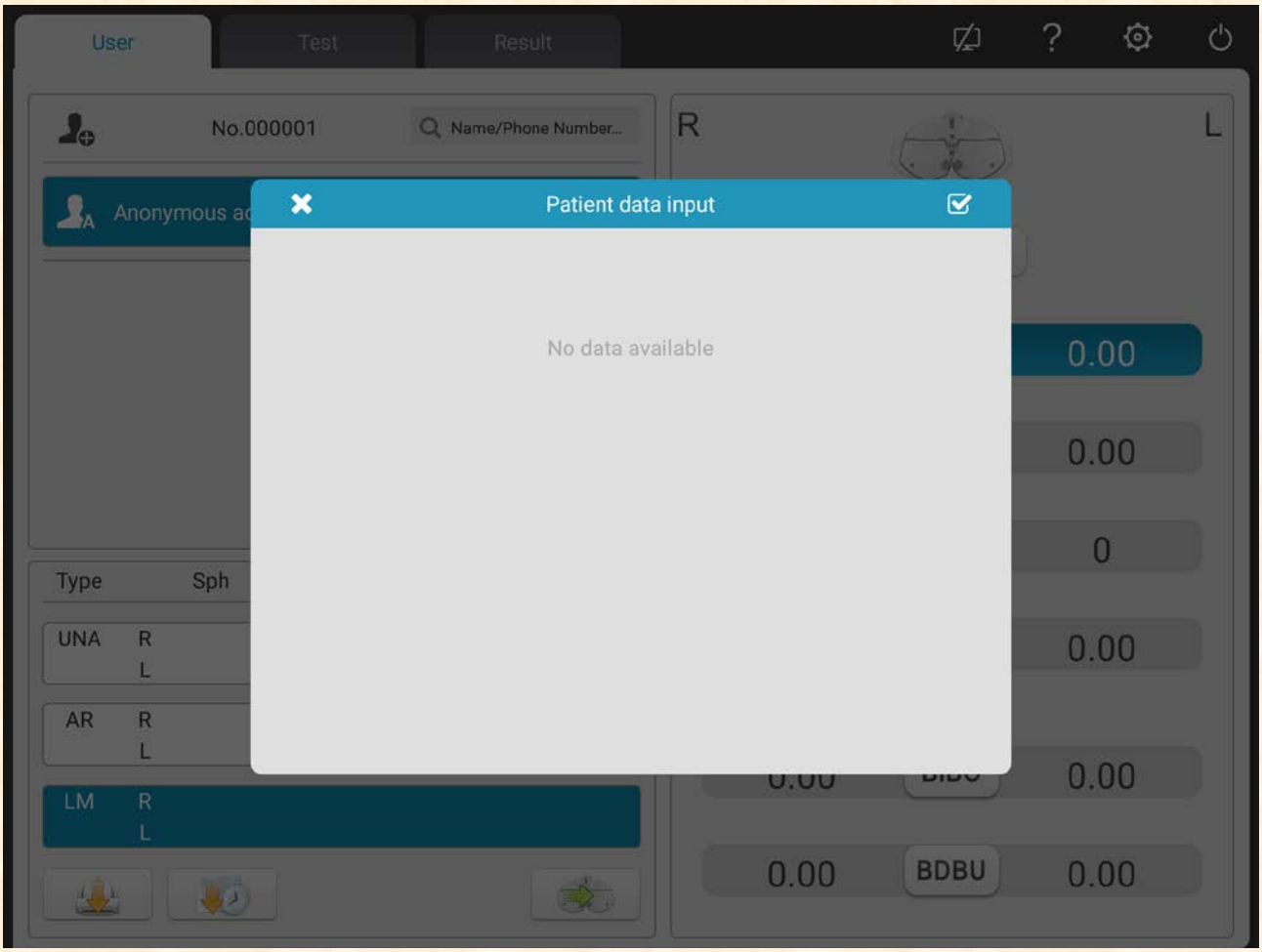
5.7.1 Communication with Lensmeter CCQ-800

1) Use special communication cable to connect CCQ-800 to the R232 port of the print box.

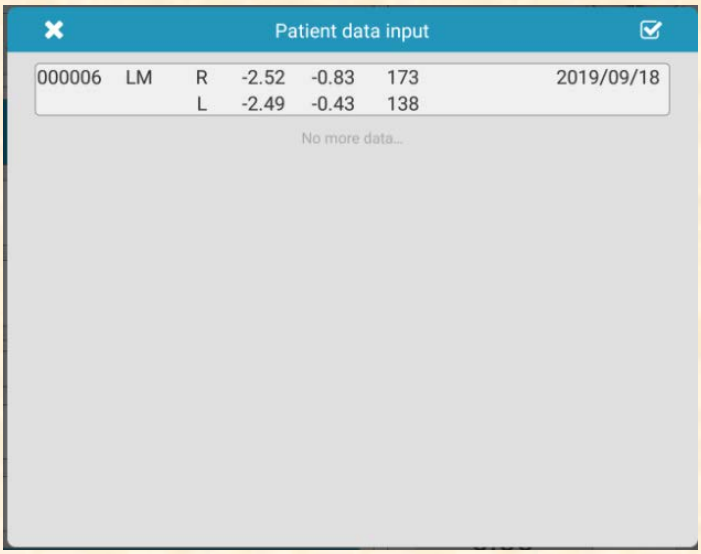
2) Click LM key



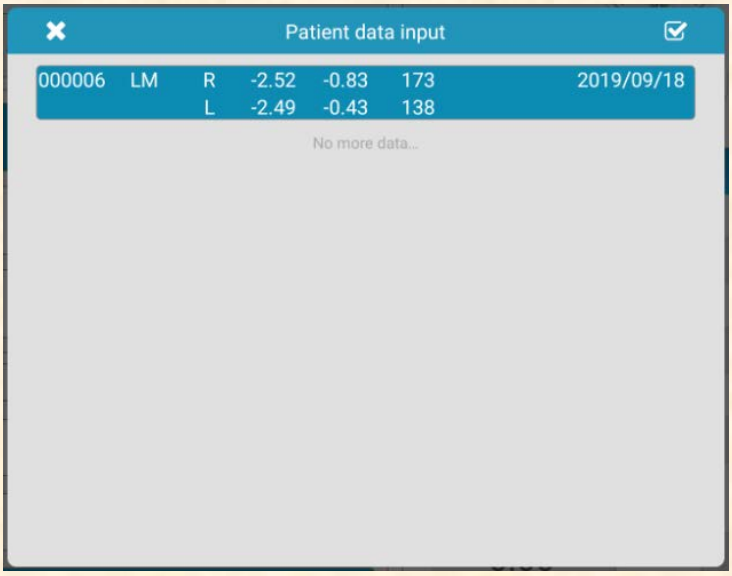
3) Click key to popup input box



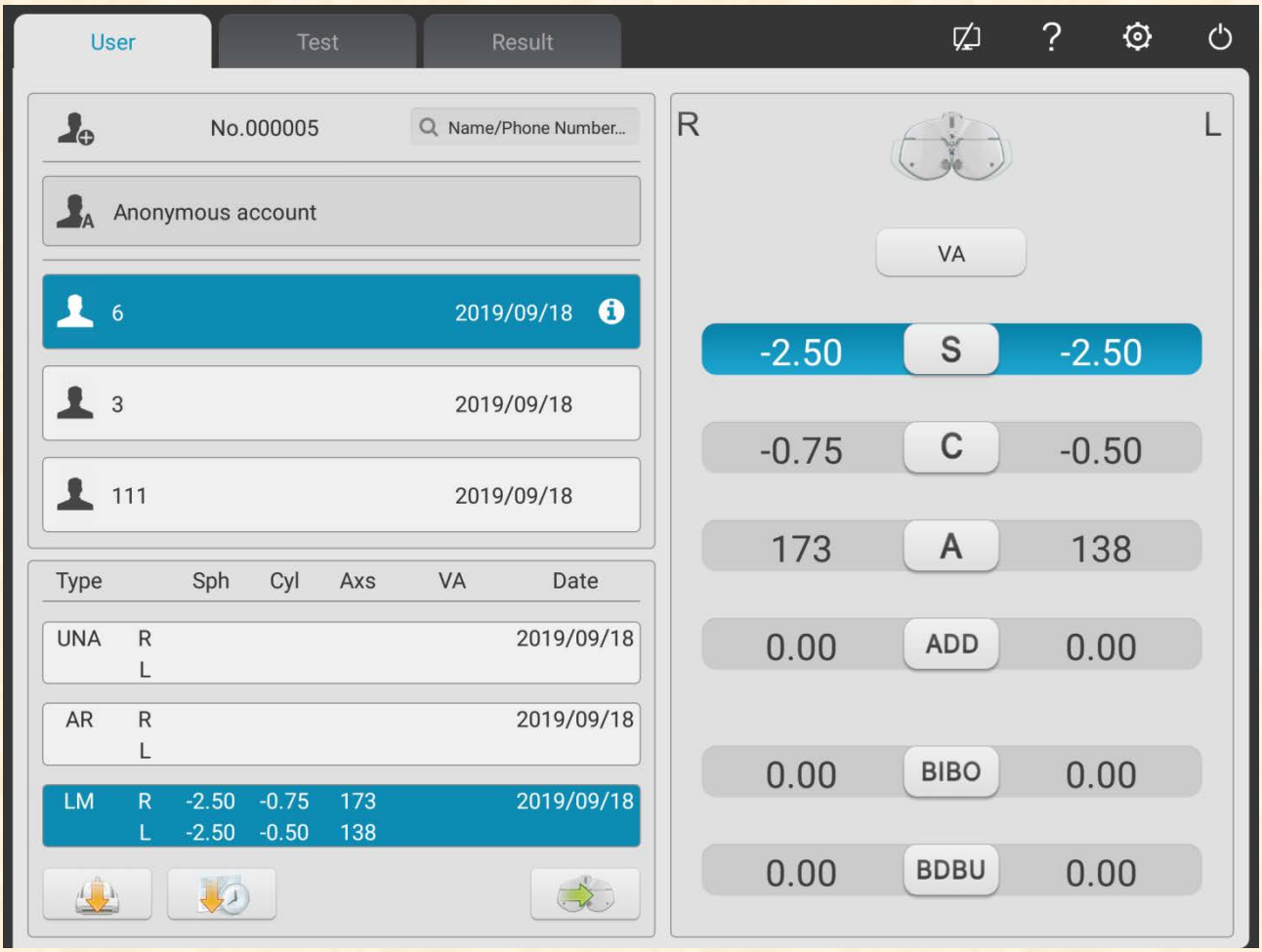
4) Use CCQ-800 lensmeter to test lens data and convey the date to YPA-2100



5) Choose “000006”.



6) Click key to complete data import.



5.8 Pre-set ADD

Relationship table between pre-set additional degree ADD and patient age (only applies to this product)

Age	Pre-set ADD degree（m^{-1}）
45 at oldest	0.75
50 at oldest	1.25
55 at oldest	1.50
60 at oldest	1.75
65 at oldest	2.00
Older than 65	2.25
N/A	Un-pre-set ADD degree

6.Troubleshooting

In the event of device trouble, please check the device as per below chart to obtain guidance. If the trouble is not shot, please contact with Chongqing Yeasn Science & Technology Co., Ltd. Maintenance Department or the authorized dealer.

Trouble	Reasons	Solutions	Remark
The device doesn't start	The power line is not correctly connected to the socket	Connect the power line correctly	
The printer doesn't exit paper	Printing papers are used out	Replace printing papers	
The printer doesn't print results	Printing papers are installed in opposite direction.	Adjust the direction of printing papers	

7.Cleaning and Protection

Attention: Do not use any corrosive detergent to clean the device, so as not to damage the device surface.

7.1 Clean the forehead baseplate

Clean the forehead baseplate before every optical test.

1）Take off the forehead baseplate

Tilt the forehead baseplate forward as shown in right figure: drag in a certain direction and take off the baseplate.

2）Clean the forehead baseplate

Wipe the forehead baseplate with clean and soft cloth. For intractable stains, please dip the clean soft cloth in mild detergent to scrub the stains away and then wipe it with dry soft cloth.

3）Restore the forehead baseplate to original position

Insert it into the device in a certain direction

7.2 Clean the nose baseplate

Clean the nose baseplate before every optical test.

1）Take off the nose baseplate from the vision tester host.

The nose baseplate is fixed on the vision tester host with magnetic steel, so it can be easily taken off.

2）Clean the nose baseplate.

Wipe the nose baseplate with clean and soft cloth. For intractable stains, please dip the clean soft cloth in mild detergent to scrub the stains away and then wipe it with dry soft cloth.

3）Restore the nose baseplate to original position

7.3 Clean the testing window

If there are dirt, oil stain, finger print or dust on the testing window, it may affect the testing accuracy.

1）For the dust: blow it away with blowing balloon with brush.

2）For dirt, oil stain and finger print: wipe it with clean and soft cloth.

Attention: Do not wipe the testing window with stiff cloth or paper; otherwise it may scratch

the testing window glass.

Attention: Wipe the testing window gently when cleaning it. Otherwise, it may scratch the testing window glass.

7.4 Clean external parts

When the external parts, such as the enclosure or panel, get dirty, please wipe them gently with clean and soft cloth.

For intractable stains, please dip the clean soft cloth in mild detergent to scrub the stains away and then wipe it with dry soft cloth.

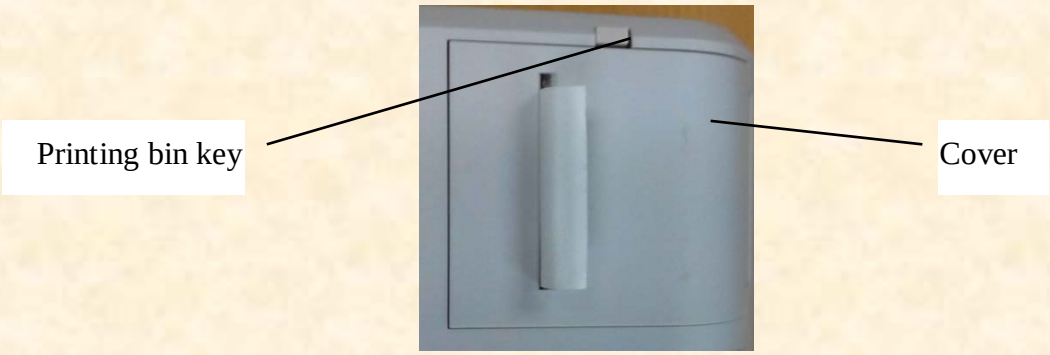
8.Maintenance and Care

8.1 Replace printing papers

When a red line occurs aside the printing paper, please stop using the printer and replace printing papers.

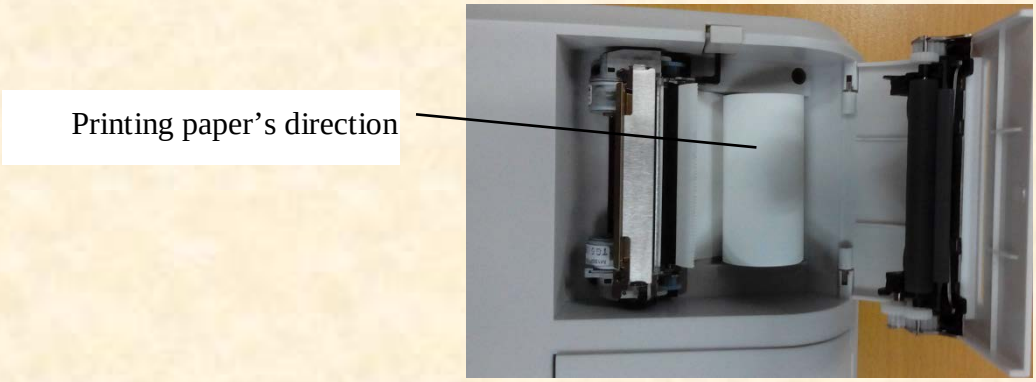
Replacing steps are as follows:

1)Press the printing bin button to open the printer cover.



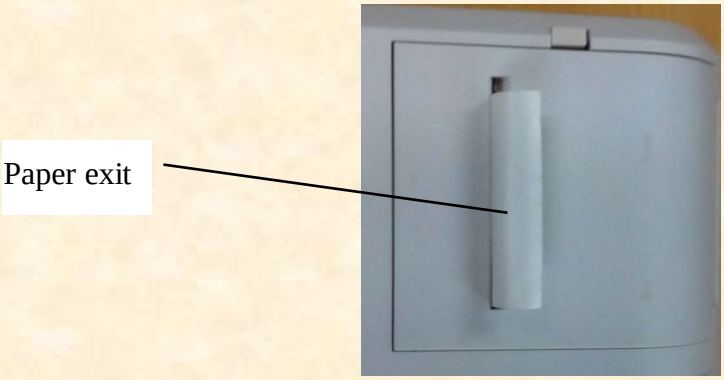
2)Take out the left paper and put in the new printing paper.

Attention: Pay attention to the paper roll's direction. If the paper roll is installed reversely, the printer won't print any data.



3)Put the printing paper through the paper exit and then close the printing cover.

Attention: Pay attention to the paper roll's direction. Do not print when there is no printing paper or pull the printing paper effortlessly, otherwise it may shorten the printer's service life.



Press the print cover, be sure the "Printing bin key" is to the pop-up state, otherwise it will not be able to print.

8.2 Repairable and replaceable parts, such as printing base and power adapter, etc., provided by the company can only be used; other unauthorized parts may reduce the minimum safety of the device.

8.3 The fuse of the device is included in the power adapter; if damaged, please replace it with the power adapter provided by the company with fuse type of T2A/250V.

8.4 Do not disassemble or repair the device arbitrarily when a failure occurs, please contact with local dealer or manufacturer.

8.5 The company is committed to providing users with necessary circuit diagrams, part list and other relevant materials as needed.

9. Environmental Conditions and Service Life

1、Environmental conditions for normal operation

Environment temperature: 10℃~35℃

Relative humidity: 30%~80% (no condensation)

Atmospheric pressure: 800hPa~1060hPa

Indoor conditions: clean and without direct high light.

2、Environmental conditions for transportation and storage

Environment temperature: -10℃~+55℃

Relative humidity: 10%~85% (no condensation)

Atmospheric pressure: 700hPa~1060hPa

3、Service life

The service life of the device is 8 years from first-time use with proper maintenance and care.

10.Environmental Protection

Please recycle or properly dispose of the used batteries and other wastes to protect the environment; please package the device at the end of life to the company, or handle it in accordance with local provisions related to environmental protection.

11.Manufacturer's Responsibility

The company is responsible for the safety, reliability and performance impact under below circumstances:

Assembly, addition, modifications, alterations and repairs are carried out by authorized personnel by the company;

Electrical facilities in the room are in conformity with relevant requirements, and

The device is used according to the User Manual.

12.Symbol Description

The applied part of the device is Type B

Attention! Please refer to accompanying documents.

Refer to instruction manual/ booklet

Manufacture date

MFG. DATE Manufacture date

Manufacturer

European certificate of conformity

Correct Disposal of This Product (Waste Electrical & Electronic Equipment) Statement: Contact the local authorities to determine the proper method of disposal of potentially bio-hazardous parts and Accessories.

Product serial number

Nonionizing radiation

Rotating Mark,+ to increase distance,- to reduce distance

Rotating Mark,The thicker the line width, the stronger the locking force

Upside down rotating

D.C. 15V power input

D.C. 15V power output

It indicates that the package contains fragile items and should be handled with care

Indicates that the shipping package should be vertically upward during transportation

Indicates that the shipping package is protected from rain

Indicates that the transport package cannot be rolled during handling

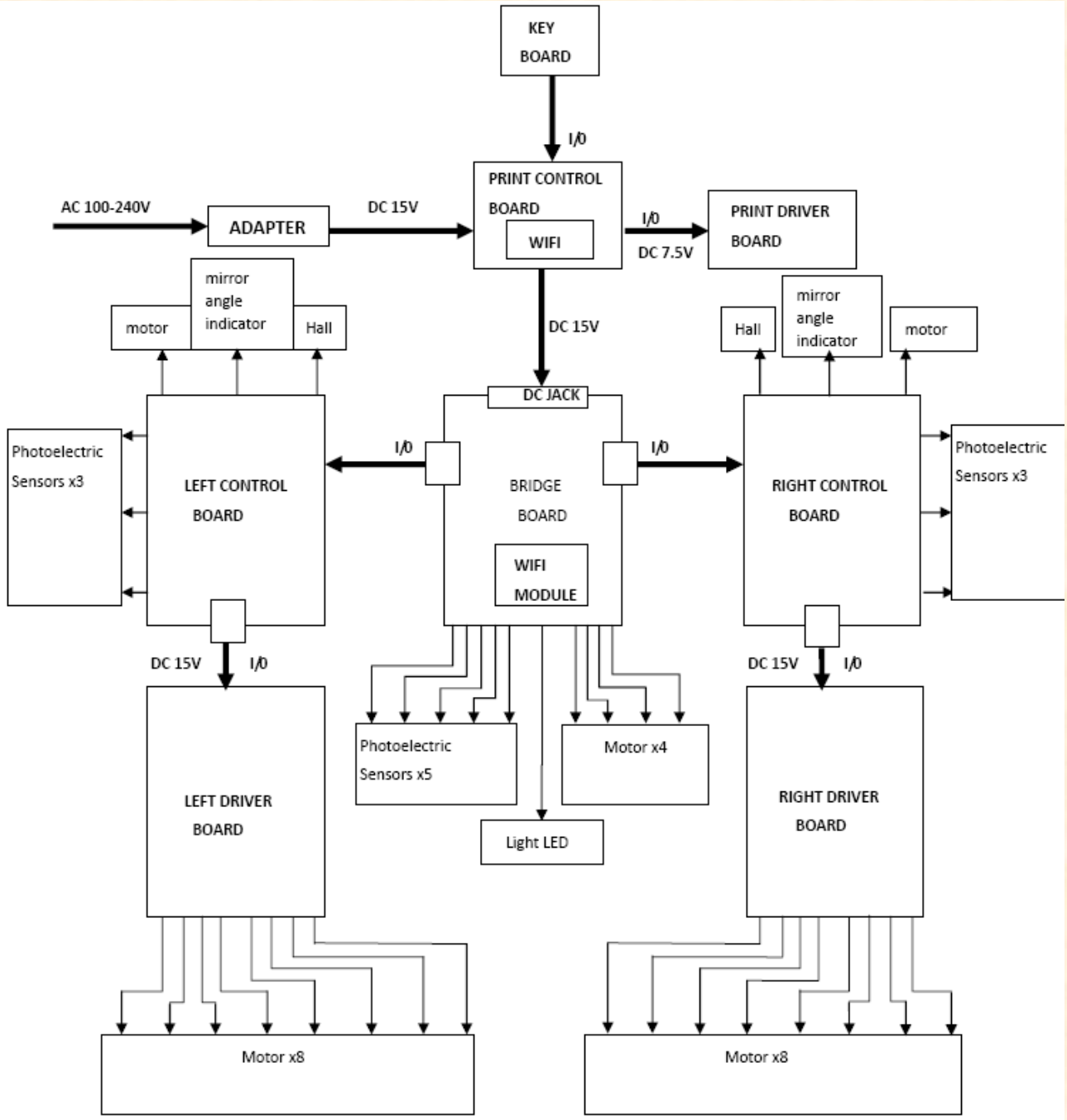
It indicates that the maximum number of layers of the same shipping package can be stacked is 5 layers

The USB interface

WLAN The WLAN interface

LAN The LAN interface

13.Electrical Schematic Diagram



For further information and services, or any questions, please contact with the authorized dealer or manufacturer. We will be happy to help you.

14.Electromagnetic Compatibility

Guidance and Manufacturer's Declaration – Electromagnetic Emissions This device is intended for use in the electromagnetic environment specified below. The customer or the user of the devices should assure that the device is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions GB 4824（CISPR 11）	Group 1	The device uses RF energy only for its internal function. Therefore, its RF emissions are very low and not likely to cause interference in nearby electronic equipment.
RF emissions GB 4824（CISPR 11）	Class B	The device is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage network that supplies building used for domestic purposes.
Harmonic emissions GB 17625.1	Class A	
Voltage Fluctuations/Flicker GB 17625.2 （IEC 61000-3-3）	Complies	

Guidance and Manufacturer's Declaration – Electromagnetic Immunity This device is intended for use in the electromagnetic environment specified below. The customer or the user of the devices should assure that the device is used in such an environment.			
Immunity test	IEC60601 Test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge（ESD） GB/T 17626.2 （IEC61000-4-2）	±8kV Contact ±15kV Air	±8kV Contact ±15kV Air	Floor should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst GB/T 17626.4 （IEC61000-4-4）	±2kV for power supply lines ±1kV for input/ output lines	±2kV for power supply lines ±1kV for input/ output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge GB/T 17626.5 （IEC61000-4-5）	±1kV line to line ±2kV line to earth ±1kV line to line ±2kV lien to earth	±1kV line to line ±2kV line to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines GB/T 17626.11 （IEC61000-4-11）	<5% Ut (>95% dip in Ut) for 0.5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec	<5% Ut (>95% dip in Ut) for 0.5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power source.
Power frequency magnetic field （50/60Hz） GB/T 17626.8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical

（IEC 61000-4-8）			commercial or hospital environment.
Note: Ut is the AC mains voltage prior to application of the test level.			

Guidance and Manufacturer's Declaration – Electromagnetic Immunity This device is intended for use in the electromagnetic environment specified below. The customer or the user of the devices should assure that the device is used in such an environment.			
Immunity test	IEC60601 Test level	Compliance level	Electromagnetic environment - guidance
Conducted RF GB/T 17626.6 （IEC61000-4-6） Radiated RF GB/T 17626.3 （IEC61000-4-3）	3 V (effective value) 150kHz - 80MHz 3 V/m 80MHZ - 2.5GHZ	3 V 3V (effective value) 3 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance d =1.2 150kHz-80MHz d =1.2 80MHz-800MHz d =2.3 800MHz-2.5GHz Where: P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer; D is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey [a] should be less than the compliance level in each frequency range [b]. Interference may occur in the vicinity of equipment marked with the following symbol.
Note 1: At 80MHz and 800MHz, the higher frequency range applies. Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection 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 filed strength in the location in which the device is used exceeds the applicable RF compliance level above, the device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the device. [b] Over the frequency range 150 KHz to 80MHz, field strengths should be less than 10V/m.			

Recommended separation distances between portable and mobile RF communications equipment and the device

These devices are intended for use in an environment in which radiated RF disturbances are controlled. The customer or the user of the device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the device as recommended below, according to the maximum output power of the communication equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter/m		
	150kHz - 80MHz d = 1.2	80MHz - 800MHz d = 1.2	800MHz - 2.5GHz d = 2.3
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be determined using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80MHz and 800MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.