Auto Refractometer

User Manual

Please read this manual carefully before using the instrument to avoid damage to the instrument and personal injury

Content

Thank you for choosing and using our products. The computer optometrist is a precise instrument that objectively measures human eyes using the shack-hartman wavefront sensing principle combined with accurate image analysis and processing technology. The instrument is used for measuring refractive errors of adult and child patients, including spherical power, cylindrical power and optical axis as well as interpupillary distance and parameters. The measurement data can be displayed on the screen or the prescription form can be printed by pressing the print key.

Structural composition

This series of computerized optometry instrument consists of an optical part, a mechanical transmission part, a software control part, a display part and a printer.

Disclaimer

1,The accuracy and completeness of the contents have been strived for during the preparation of this manual, but there is no guarantee that this manual contains no omissions or errors in interpretation.

2,We reserve the right to modify the software and hardware of this product without any declaration.

3,The Company reserves the final right to interpret the manual.

1,Electromagnetic compatibility guidelines and manufacturer's statement:

This product complies with the relevant regulations on electromagnetic compatibility described in this manual, and in order to ensure compliance with these regulations, the user is required to install and use the device according to the information provided in this manual. Use of cables not supplied by the manufacturer may result in increased emissions or reduced immunity of the product.

Alert:

1,Use of cables not supplied by the manufacturer may result in increased electromagnetic radiation or reduced immunity of the product.

2,Portable or mobile radio frequency communication equipment, including cables, shall not be used on any part of the optometer closer to the recommended isolation distance.

3,except for transducers and cables sold by the manufacturer of the equipment or

system as spare parts for internal components, the use of accessories, transducers and cables other than those specified may result in increased emissions or reduced immunity of the equipment or system.

4,The equipment or system shall not be used close to or stacked with other equipment,If it must be used close to or stacked, it shall be observed and verified to operate normally in the configuration in which it is used.

5,use of extra-specified accessories, transducers or cables with equipment and systems may result in increased equipment or system emissions or reduced immunity.

1.1 Electromagnetic emission guidelines and manufacturer's statement: (Table 1)

<table>
<tr><td colspan="3">Guide and manufacturer's statement-electromagnetic emissions</td></tr>
<tr><td colspan="3">[prototype] is expected to be used in the following specified electromagnetic environment, the buyer and the user shall ensure that it is used in this electromagnetic environment</td></tr>
<tr><td>launching test</td><td>Compliance</td><td>Electromagnetic environment-guide</td></tr>
<tr><td>Radio frequency emission GB 4824</td><td>1 group</td><td>[prototype] uses rf energy only for its internal functions. As a result, its radio frequency emissions are low and the potential for interference with accessory electronics is low</td></tr>
<tr><td>Radio frequency emission GB 4824</td><td>Class b</td><td rowspan="3">[prototype] suitable for use in all facilities including domestic facilities and direct connection to residential public low voltage power supply network</td></tr>
<tr><td>Harmonic emission GB 17625.1</td><td>inadequacy</td></tr>
<tr><td>Voltage fluctuationscintillation emission GB 17625.2</td><td>inadequacy</td></tr>
</table>

1.2 Electromagnetic immunity guidelines and manufacturer's statement: (Table 2)

<table>
<tr><td colspan="4">Guide and manufacturer's statement-electromagnetic immunity</td></tr>
<tr><td colspan="4">[prototype] is expected to be used in the following specified electromagnetic environment, the buyer and the user shall ensure that it is used in this electromagnetic environment</td></tr>
<tr><td>Immunity test</td><td>IEC60601 test level</td><td>Coincidence level</td><td>Electromagnetic environment-guide</td></tr>
</table>

static discharge GBT 17626.2	6 kv contact discharge 8 kv air discharge	6 kv contact discharge 8 kv air discharge	The floor shall be of wood, concrete or tile and, if covered with synthetic material, shall have a relative humidity of at least 30%
electrical fast transient GBT 17626.4	2 kv pair power line 1 kv pair inputoutput line	2 kv pair power line	The mains supply should be of the quality used in a typical commercial or hospital environment
surge GBT 17626.5	1 kv line to line 2 kv line to ground	1 kv line to line 2 kv line to ground	The mains supply should be of the quality used in a typical commercial or hospital environment
Voltage sags, short interruptions, and voltage variations on the power input line GBT 17626.11	< 5%Ut for 0.5 cycles (on Ut, > 95% sag) 40% Ut for 5 cycles (60% sag on Ut) 70% Ut for 25 cycles (30% sag on Ut) < 5% Ut for 5s (on Ut, > 95% sag)	< 5%Ut for 0.5 cycles (on Ut, > 95% sag) 40% Ut for 5 cycles (60% sag on Ut) 70% Ut for 25 cycles (30% sag on Ut) < 5% Ut for 5s (on Ut, > 95% sag)	The mains supply should be of the quality used in a typical commercial or hospital environment. If the user of the [prototype] needs continuous operation during power outages, it is recommended that the [prototype] be powered by an uninterruptible power supply or battery
Power frequency magnetic field (50Hz) GBT 17626.8	3Am	3Am	The power frequency magnetic field shall have power frequency magnetic field level characteristics typical of typical locations in typical commercial or hospital environments
Note: Ut refers to the AC network voltage before the test voltage is applied.			

1.3 Electromagnetic immunity guidelines and manufacturer's statement: (Table 3)

<table>
<tr><td colspan="4">Guide and manufacturer's statement-electromagnetic immunity</td></tr>
<tr><td colspan="4">[prototype] is intended to be used in the electromagnetic environment specified below, and the purchaser or user shall guarantee its use in such electromagnetic environment</td></tr>
<tr><td>Immunity test</td><td>IEC 60601 test level</td><td>Coincidence level</td><td>Electromagnetic environment-guide</td></tr>
<tr><td>Radio frequency conduction GBT 17626.6

radio-frequency radiation GBT 17626.3</td><td>3 V (rms)
150 kHz ~ 80 MHz

3 Vm
80 MHz ~ 2.5 GHz</td><td>3V (valid values)

3 Vm</td><td>Portable or mobile radio frequency communication equipment, including cables, shall not be used on any part of the [prototype] closer to the recommended isolation distance. This distance shall be calculated by a formula corresponding to the transmitter frequency. Recommended isolation distance
d=1.2
d=1.2 80MHz ~ 800MHz
d=2.3 800MHz ~ 2.5GHz
Where: P—in watts (W) according to the maximum rated output power of the transmitter provided by the transmitter manufacturer;
D—recommended isolation distance in meters (m).
The field strength of the stationary rf transmitter is determined by surveying the electromagnetic field a and should be lower than the coincidence level at each frequency range b. Interference may occur in the vicinity of equipment marked as conforming.,</td></tr>
<tr><td colspan="4">Note 1: at 80 MHz and 800 MHz, the higher band formula is used.
Note 2: These guidelines may not be appropriate for all situations where electromagnetic propagation is affected by absorption and reflection from buildings, objects, and humans.</td></tr>
</table>

A field strengths of stationary transmitters, such as base stations for wireless (cellularcordless) telephones and terrestrial mobile radios, amateur radios, am and fm radio broadcasts, and television broadcasts, are theoretically unpredictable. In order to evaluate the electromagnetic environment of a fixed radio frequency transmitter, a survey of the electromagnetic field should be considered. If the field strength of the [prototype] is measured to be at a location above the applicable rf compliance level, the [prototype] shall be observed to verify proper operation. If abnormal performance is observed, additional measures may be necessary, such as re-aligning the orientation or position of the [prototype]

B the field strength should be less than 3 Vm over the entire frequency range of 150 kHz ~ 80 MHz.

B the field strength should be less than 3 V/m over the entire frequency range of 150 kHz ~ 80 MHz.

Recommended isolation distance between portable and mobile rf communication equipment and [prototype]

[Prototype] Expected to be used in an electromagnetic environment where RF radiation disturbance is controlled. Depend on that maximum rated output pow of the communication device, the purchaser or user may prevent electromagnetic interference by maintaining a minimum distance between the portable and mobile radio frequency communication device (transmitter) and the [prototype] as recommended below

Maximum rated output power w of transmitter	Isolation distance corresponding to different frequencies of transmitter m		
	150kHz ~ 80MHz $d=1.2\sqrt{P}$	80MHz ~ 800MHz $d=1.2\sqrt{P}$	800MHz ~ 2.5GHz $d=2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
one	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For the maximum rated output power of the transmitter not listed in the above table, the recommended isolation distance d, in meters (m), can be determined by using the formula in the frequency column of the corresponding transmitter, where p is the maximum rated output power of the transmitter in watts (w) provided by the transmitter manufacturer.

Note 1: At 80MHz and 800MHz, the equation for the higher frequency range is used.

Note 2: these guidelines may not be appropriate for all situations where electromagnetic propagation is affected by absorption and reflection from buildings, objects, and humans.

2. ⚠ Notes: Unscrew the screws here before use.

2.1 Use precautions:

2.1.1 Please do not open and touch the inside of the instrument at will to avoid electric shock or instrument failure.

2.1.2 Please keep the instrument well grounded so as not to endanger personal safety or damage the instrument.

2.1.3 Use the touch screen (resistance screen, please contact and hold for about 0.1 second),It is not appropriate to use excessive force when pressing the key to avoid damage to the display.

2.1.4 When the machine is placed in a place with direct sunlight or strong indoor light, the measurement accuracy will be affected. Dark room measurements are recommended.

2.1.5 Please do not use the instrument in an excessively humid or dusty environment, which may have adverse effects on the instrument.

2.1.6 Follow our local distributor's instructions if you need to connect the machine to other equipment or systems.

2.1.7 sudden rise in the temperature of the room in cold areas will make the protective glass of the measurement window and the optical parts inside the machine condensation, if such a situation occurs, please wait for the condensation completely disappear before starting the measurement.

2.1.8 Keep the lens on the side of the measured person clean at all times, because dirt or other substances may cause measurement errors or affect the measurement accuracy of the machine.

2.1.9 If smoke, abnormal odor and sound appear during the use of the machine, immediately turn off the power, unplug the power supply and contact the local distributor.

2.1.10 Instructions for use of some materials that are in direct contact with skin: When the customer operates the instrument, the parts where the instrument and the patient touched should be separated with Hanma _ viscose spunlace medical gauze (size: 8cm*8cm) to avoid the patient from directly contacting the surface of the instrument.

2.2 Storage precautions

2.2.1 do not store the instrument in a damp, toxic, corrosive liquid or gas.

2.2.2 The instrument shall be stored in a place without direct sunlight and with appropriate temperature and humidity.

2.3 Move Precautions

2.3.1 Handle the instrument with care to avoid collision or falling,A strong impact may damage the appearance and function of the instrument.

2.3.2 If it is necessary to move the instrument, turn off the power supply and keep the moving sliding plate in a locked state,Use two hands to firmly grasp the bottom of the instrument for handling.

2.4 Precautions after use

2.4.1 If the machine is not used for a long time, please turn off the power and unplug to prevent fire.

2.4.2 instrument after use should turn off the power supply and cover the dust device. A long time

of power supply will reduce the service life of the instrument,If the dust cover is not covered for a long time, the falling dust will affect the measurement accuracy.

2 . 5 Maintenance precautions

2.5.1 This instrument is a precision optical instrument,It needs to be calibrated regularly and the moving part should be filled with lubricating oil regularly.

2.5.2 replace the fuse, must pull out the power plug, and replace the fuse of the correct specification, in order to avoid fire.

2.5.3 One thousand instrument failure, need to open the maintenance, must be approved by the manufacturer or contact the local distributor, completed by professional maintenance personnel. After self-disassembly, the manufacturer has the right not to be liable for maintenance.

2.5.4 The product is a non-sterile medical device. The end user uses a soft wet cloth and sponge dipped in detergent to clean and disinfect the product daily. Please do not use alcohol, Tianna water, benzene and other organic compounds to clean the surface of the machine to avoid damage to the instrument. The measurement window is often cleared of dust with a soft cloth to maintain measurement accuracy;

2.5.5 disinfection method to determine the basis

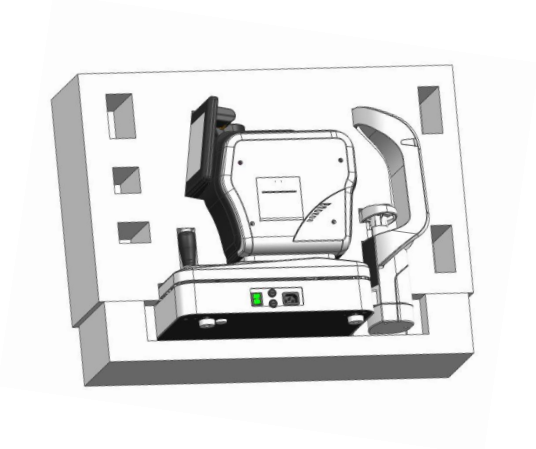
According to the requirements of "disinfection of environment and object surface" in hospital disinfection health standards GB 15982-2012, the general parts of the product were cleaned in time, and the jaw support, forehead rest and handle were disinfected at the medium level.

According to WS/T 367-2012 Technical Specification for Disinfection in Medical Institutions, alcohol disinfectants were selected for jaw supports, forearms and handles. Wipe the surface of the object with 75% by volume of an alcohol solution.

3 disassembly, packaging and installation:

3.1 take out the machine notes and steps:

Grasp the foot at the bottom and the forehead support with both hands respectively and lift up for taking out,Please do not move the screen and handle (see Fig,1).



(figure 1)

3.2 Power switch, fuse, power interface, USB interface, 232 interface, VGA interface (see Figures 2 and 3)

Firmly plug the power cord equipped with the instrument into the power interface (for connecting

the 232 interface, please contact the manufacturer or local distributor);

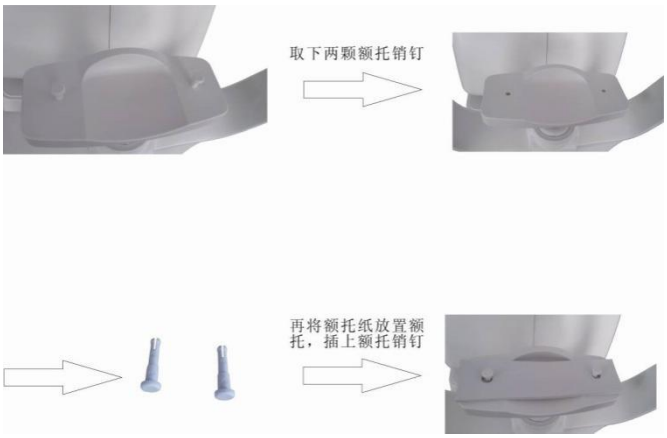
(Figure 2) (Figure 3)

Power socket: AC power supply access: AC 110 V–220 V, fuse: F5AL 250 V;

Data interface: USB\RS232\VGA interface connects with external equipment (comprehensive optometer, LCD screen, etc., and after-sales technical personnel should be contacted).

3.3 install jaw supporting paper method:

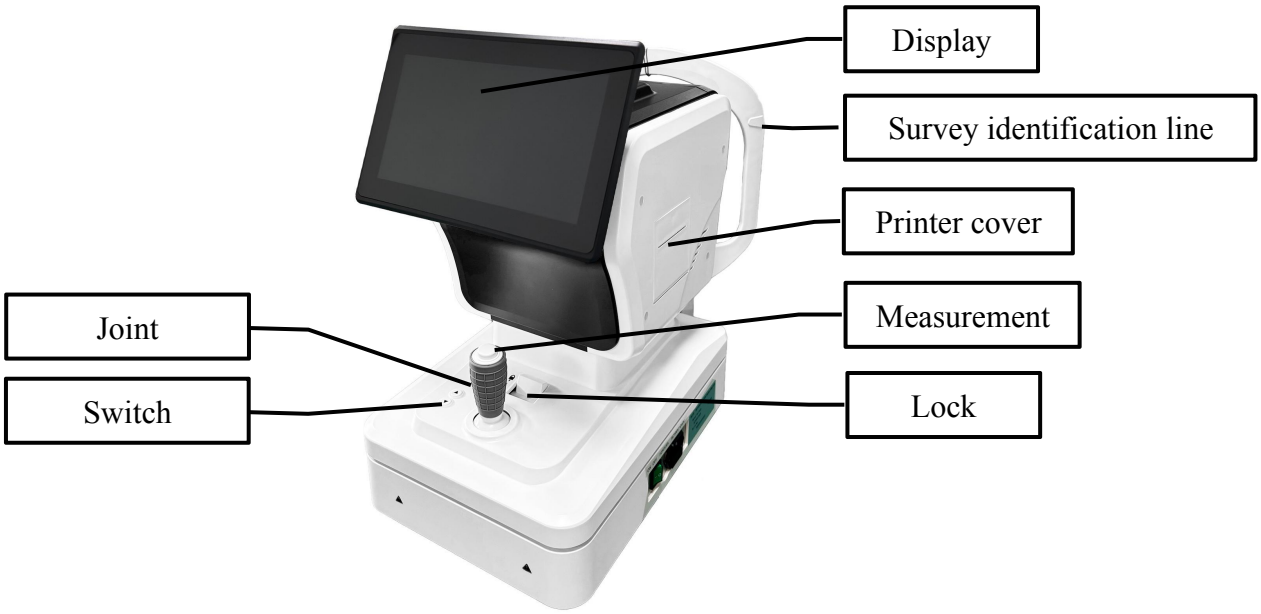
Use a suitable size of jaw paper (see Figure 4)



(figure 4)

4,appearance structure name and function introduction:

4.1 front (see figure 5)



(figure 5)

4.1.1 Display screen: measurement display monitor;
4.1.2 Measurement mark line: the height position of the eye of the measured person;
4.1.3 Printing cabin cover: Press the panel to open or close the printing cabin, and replace the printer paper;
4.1.4 Measurement key: perform measurement after the coke is adjusted;
4.1.5 stop button: lock the movable sliding table;
4.1.6 Body control lever: move forward, backward, left, right, up and down for focusing;
4.1.7 Hubei drag lift switch: adjust the forehead of the patient to the appropriate position;

4.2 back (see figure 6)

(figure 6)

4.2.1 Mandibular support: the platform on which the patient's mandible rests;
4.2.2 forehead cushion: the position where the patient's forehead is abutted;
4.2.3 Measurement window: the entrance pupil of the patient's pupil;

5 main technical performance parameters:

5.1 Measurement range of optometer:

5.1.1 The measurement range of spherical power is − 20 m − 1 to+20 m − 1 (minimum resolution is 0.01 m − 1)
5.1.2 The measurement range of column power (absolute value) is 0 m-1–6 m-1 (minimum resolution is 0.01m-1)
5.1.3 The measurement range of axial position of cylindrical lens is 0–180 (with minimum resolution of 1).
5.1.4 The measurement range of the principal meridian axis is 0–180 (with a minimum resolution of 1).

5.2 Other performance parameters:

5.2.1 Use 9-inch TFT touch screen (adjustable viewing angle).
5.2.2 printers: 30 * 57 mm thermal printers
5.2.3 Visible light illumination value at exit pupil: < 3 LX

5.2.4 supply voltage: AC100-240V
5.2.5 Power supply frequency: 50-60Hz
5.2.6 power consumption: 60VA
5.2.7 Net weight: 25Kg
5.2.8 Outline dimensions: length 480 mm× width 261mm × height 435mm
5.2.9 The service life of this optometer is 10 years,In order to ensure accurate measurement, please conduct measurement verification every year.

5.3 Protection level:

5.3.1 Product grade: medical device grade II
5.3.2 Electrical shock: Class I (grounding)
5.3.3 Electrical shock protection level: Class B

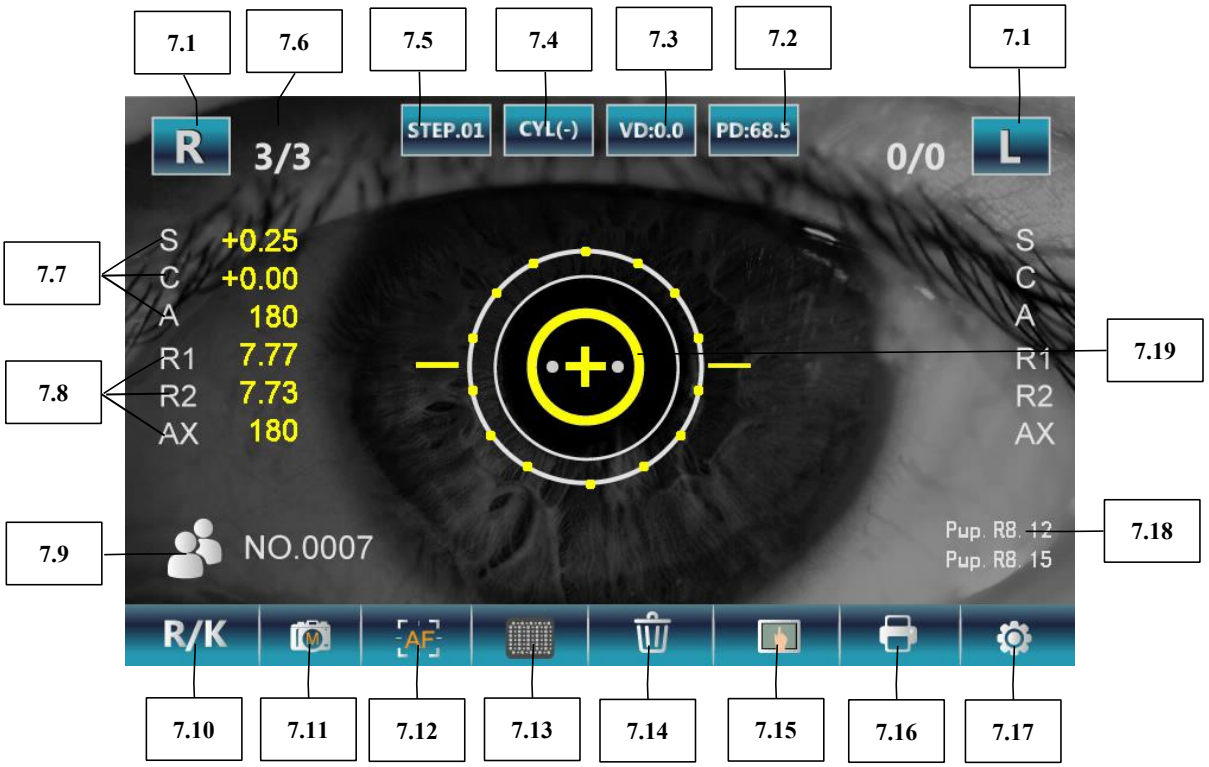
5.4 Equipment type:

5.4.1 Anti-electric shock type: Class I equipment;
5.4.2 Anti-electric shock degree: Type B application part;
5.4.3 Non-AP equipment, non-APG equipment;
5.4.4 Operation mode: continuous operation;
5.4.5 equipment cannot be used in the environment of flammable anesthesia gas.

6 Environmental conditions:

6.1 Environmental temperature: 10 C–30 C
6.2 Environmental relative humidity: (30–75)% RH
6.3 Air pressure: 86 kPa–106 kPa
6.4 altitude: below 2000m
6.5 There is no strong vibration and corrosive gas around the optometrist
6.6 No strong electromagnetic interference around the optometer
6.7 The ambient illumination of optometer shall be less than 150Lx.
6.8 The optometer shall be placed on a horizontal lifting table top.

7 screen display (see figure 7):



(figure 7)

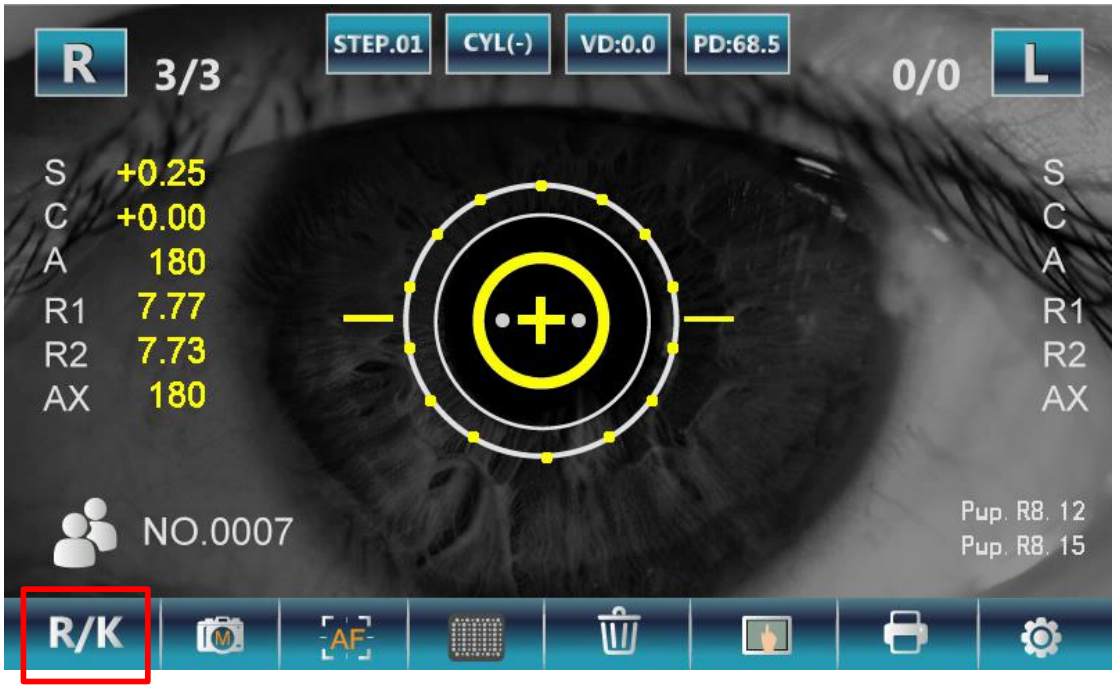
7.1 left/right eye logo flashing icon said the current measured eye
7.2 Pupil distance parameter display value
7.3 VD select shortcut keys
7.4 astigmatism symbol selection shortcut keys
7.5 step size selection shortcut key
7.6 Number of refractive/corneal parameter measurements
7.7 refractive measurement parameters
7.8 Corneal measurement parameters
7.9 patient record parameters
7.10 measurement mode selection key
7.11 Automatic/manual measurement selection key (A automatic measurement, M manual measurement)
7.12 Automatic tracking measurement selection key (AF automatic tracking, MF manual)
7.13 Hartmann Array Display
7.14 data clear key
7.15 data record view
7.16 print data button
7.17 setting menu keys
7.18 Left and right eye pupil diameter
7.19 Pupil Alignment to Target

8 menu:

8.1 measurement mode selection key (see figure 8):

Touching this button will select three measurement modes in sequence, and the customer can select any measurement mode as required;

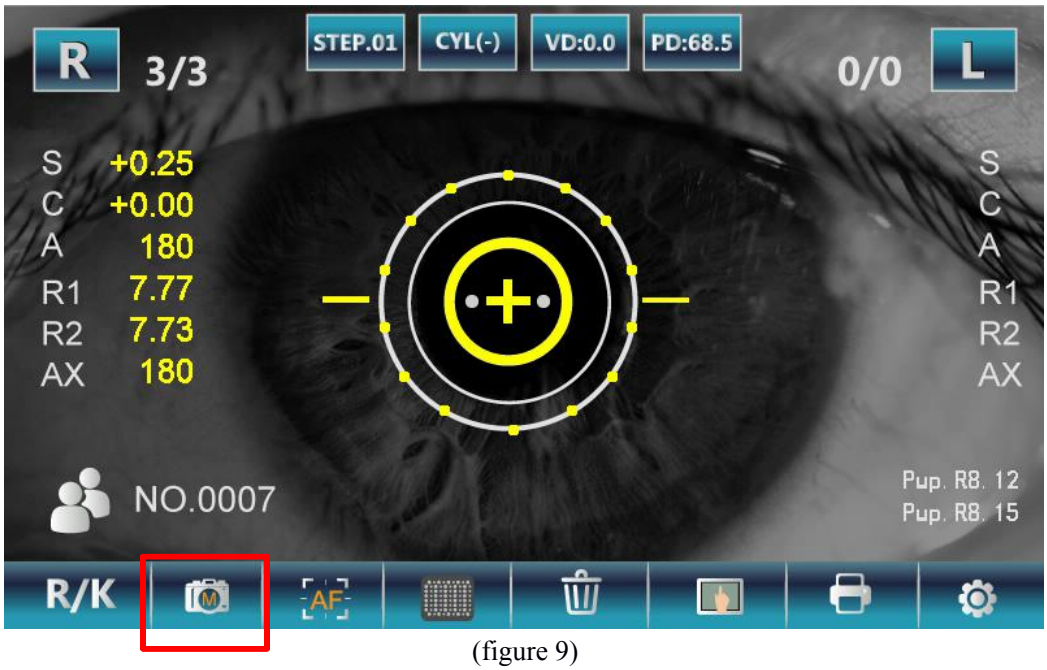
(KER is in corneal curvature measurement mode, R/K is in refractive/corneal measurement mode, and REF is in refractive parameter measurement mode)



(figure 8)

8.2 automatic manual measurement selection key (see figure 9):

Touch ( or ) this button to select automatic a and manual m measurement;

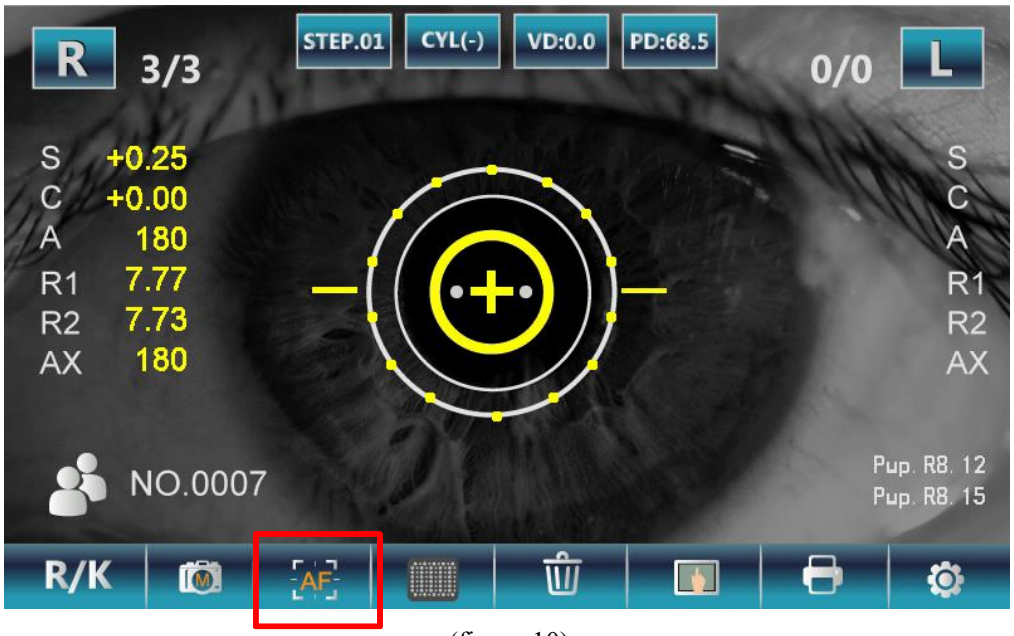


(figure 9)

8.3 Automatic tracking and manual operation of selection keys (see Fig,10):

Touch ( or ) this button to select two operation modes: automatic tracking AF and manual operation MF;

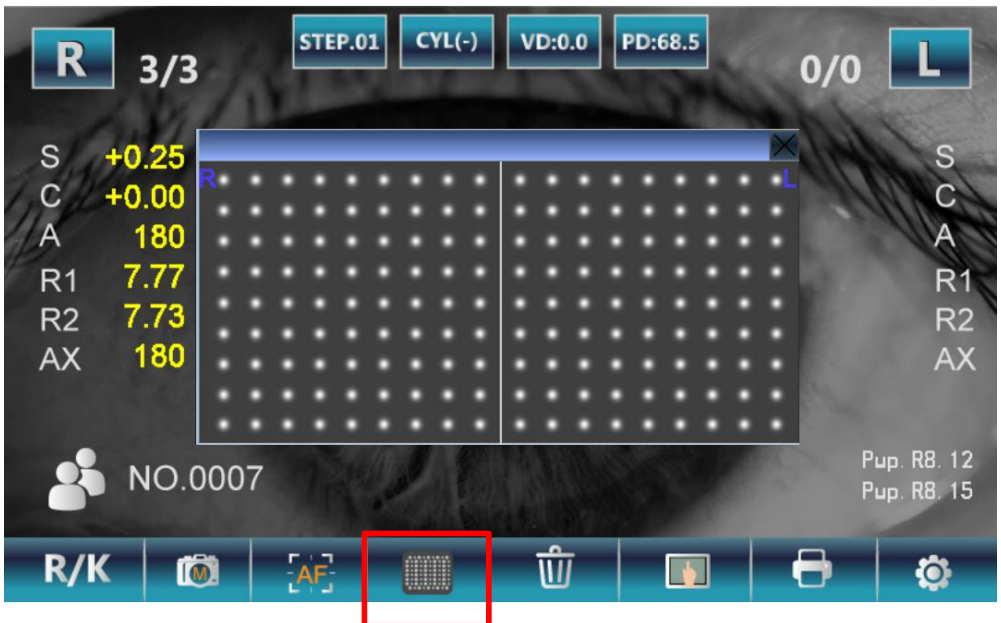
Note: Automatic tracking AF refers to the way that the eyepiece of the body is automatically tracked up and down relative to the eyeball within a certain measurement range.



(figure 10)

8.4 dot matrix display button (see figure 11):

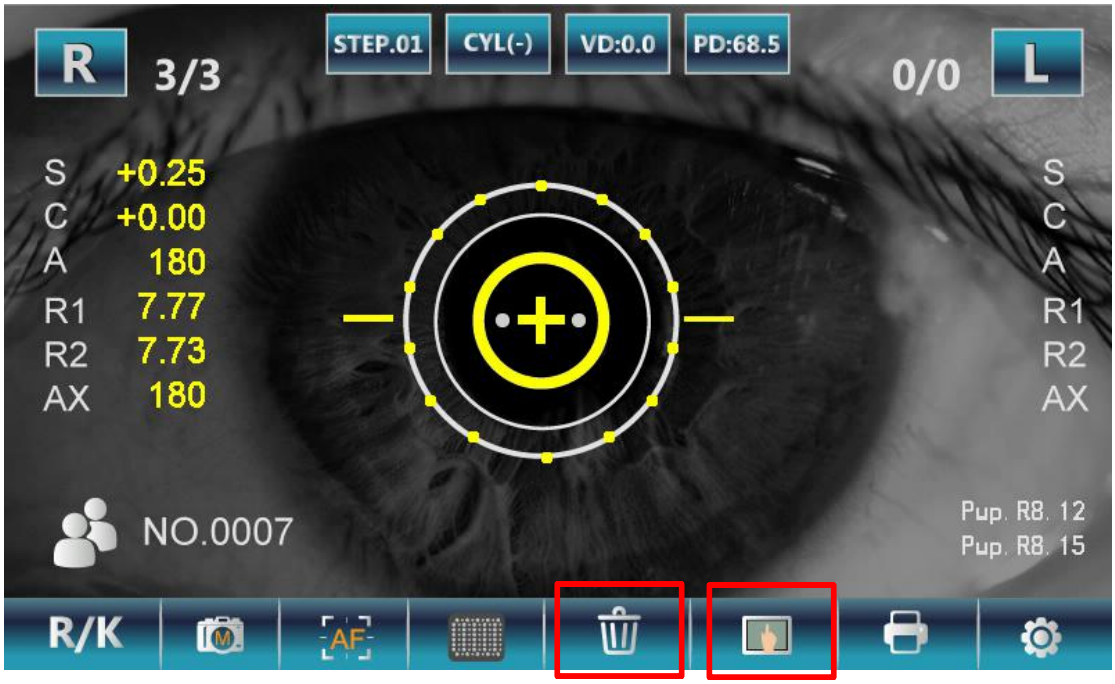
Pressing the () lattice button can display the lattice distribution of the fundus of the patient (indirectly judge the quality of fundus imaging);



(figure 11)

8.5 data clear key (see figure 12):

Touching () this button will clear the measurement data;



(figure 12)

8.6 Data record viewing (see Figure 12):

Touch () this button to enter the data record viewing menu (see Fig,13):

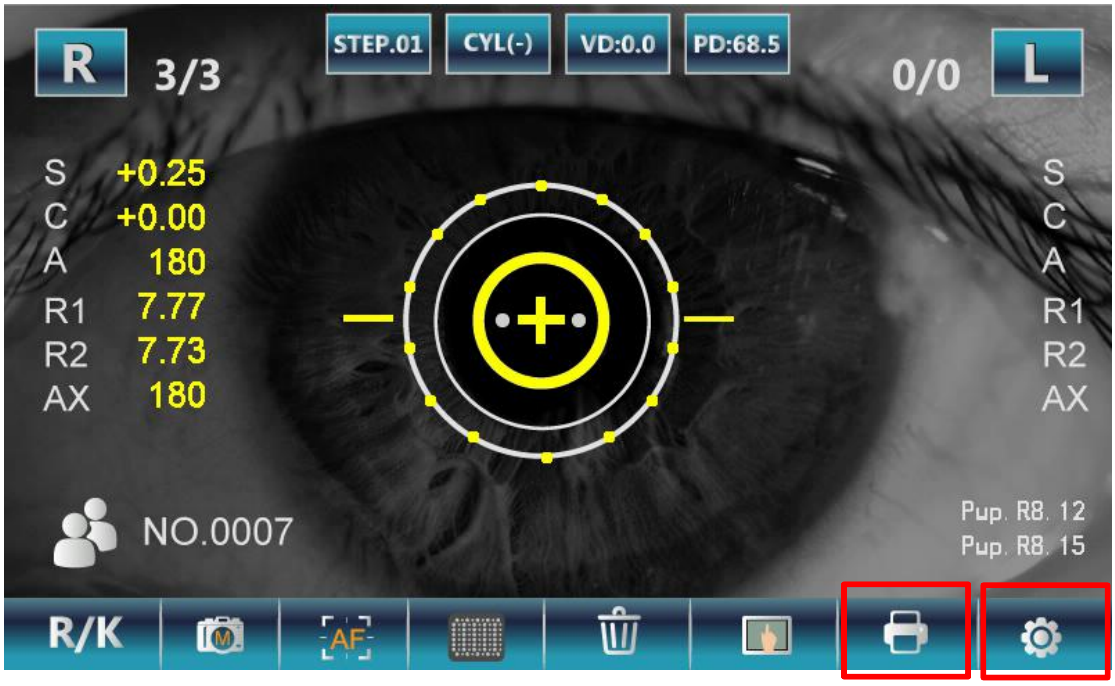
(figure 13)

Up to 10 measurement data and average values can be recorded for left and right eyes respectively,Refs and KER are touched to select refractive and corneal parameter record data, and

the clear key is touched to clear the record, and the return key is touched to return to the measurement interface.

8.7 print button (see figure 14):

Press the () print button to print the measurement data for the current measurement mode;



(figure 14)

8.8 Setup menu: (see Figure 14):

Touch the Settings () menu key to enter the Settings submenu (tick the corresponding options);

8.8.1 diopter setting (see figure 15):

(figure 15)

The diopter setting has four options

VD: The distance from the posterior vertex of the lens to the cornea can be 0.0mm (contact lens) 12.0mm (Asian) 13.5mm (Middle East) 15.0mm (European) Select the appropriate setting.

Cylindrical lens: astigmatism sign is selected as negative positive and mixed mode respectively

Step length: display precision of measurement parameters

Image: visible guide mark atomizing function switch (guide mark atomizing position)

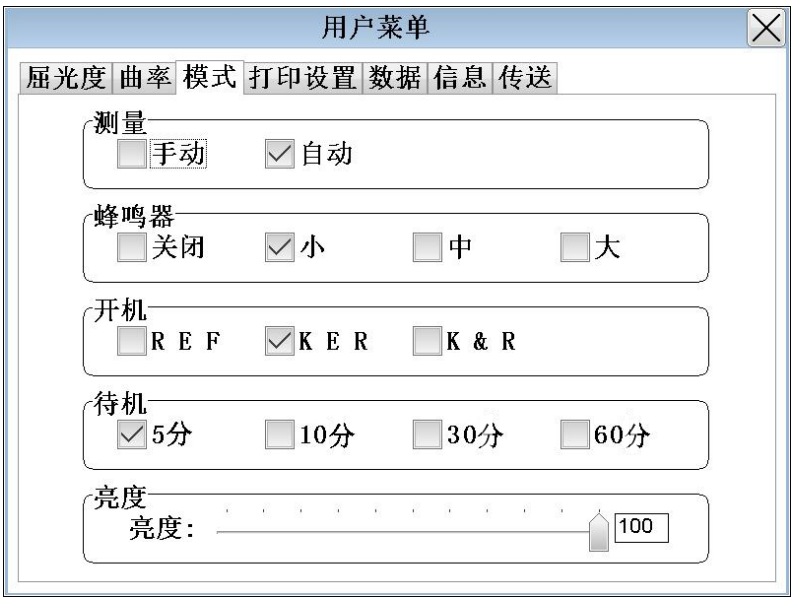
The curvature setting has three options

Mode: The corneal radius of curvature (mm) and corneal diopter (m − 1) can be optionally measured and displayed as an average value.

Step size: corneal diopter display accuracy

Refractive index: factory default 1.3375

8.8.2 mode setting (see figure 16):



(figure 16)

The mode setting has four options

Measurement: both manual and automatic modes are available (an automatic measurement icon in grey indicates this feature is not available for this model)

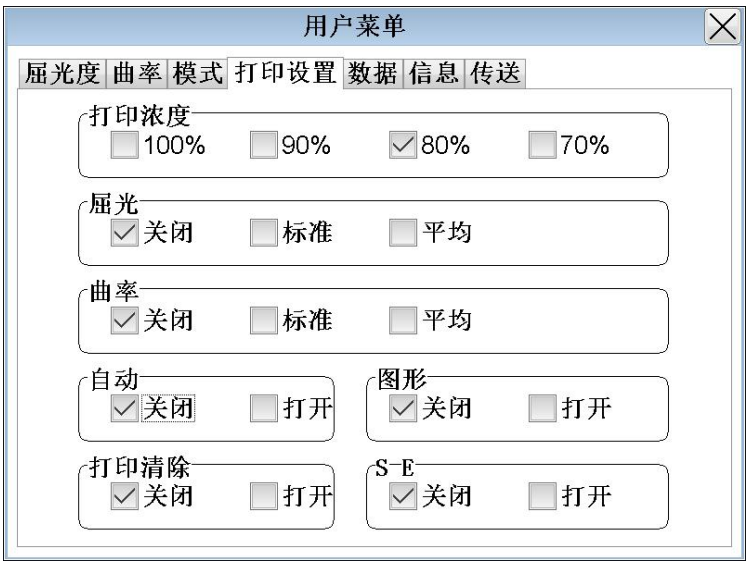
Buzzer: no tone when touching the button after closing

Power-on: measurement mode is selected (the same as the function of the measurement main interface),the default startup mode is selected for each power-on

Standby: standby time setting of the instrument (wake up by touching any key)

Brightness: lcd brightness setting

8.8.3 print settings and replace the printing paper (see figure 17, 18):



(figure 17)

8.8.4.1 print settings have nine options:

Concentration: set appropriate printing concentration according to different thermal printing paper

Refraction: When this option is selected to be off, the refraction parameters will not be printed; When this option select standard, refractive parameters all print; When Average is selected by this option, only the refractive average is printed.

Curvature: when this option is selected off, the curvature parameter will not print; When this option select standard, curvature parameters all print; When average is selected for this option, only the curvature average is printed.

Automatic: When this option is selected to be turned on, the measurement results will be automatically printed (data will be automatically cleared) after binocular measurement.

When this option is selected to be off, the measurement results are printed by pressing the print key on the operation keyboard.

Graphics: when this option is selected off, the refractive status map will not be printed.

8.8.4.2 print clear: automatically clear after printing.

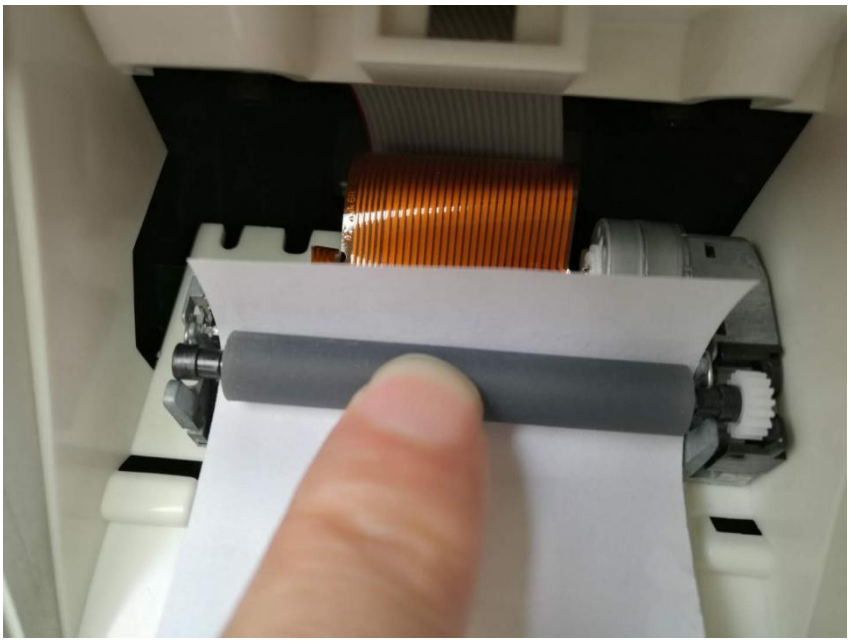
SE: When this option is selected to be off, SE data will not be printed.

Pupil: when this option is selected off, pupil diameter data will not be printed.

BC: BC will not be printed when this option is selected to be off.

8.8.4.3 paper loading method (see figure 18):

Press the indication mark on the panel of the printing engine room to open the printing engine room, trim and level the head of the printing paper, remove the paper feeding roller, stick the printing paper on the heating head of the printer, install the paper feeding roller, arrange the printing paper roll, and close the printer door.



(figure 18)

8.8.5 Data setting (see figure: 19):

(figure 19)

The data settings have five options

Date format: date, month, and day display sequence

Date: date, month, day, time input

Time: hour minute second input

Automatic counting: when this option is selected to be off, the number of patient measurements in the measurement main interface stops refreshing and increases.

Count: number of patient measurements setting patient number setting

Touch the date, time or number option, enter the number drop-down, and select the appropriate

number.

8.8.6 print information settings (see figure 20):

Print information setting options can be set up two information bar, customers can be set up and print the customer information such as shop name. Press ENTER to confirm and exit saving after setting.

(figure 20)

Touch the information bar box to enter the print information setting.

ENT key to confirm and save

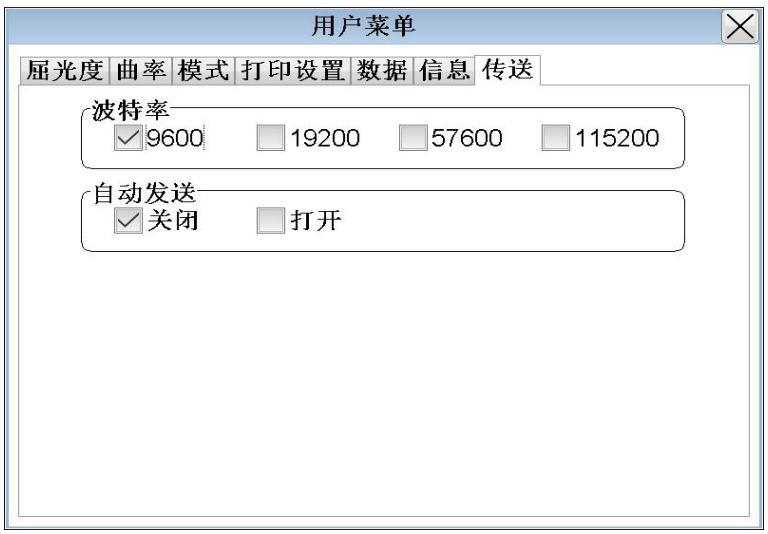
A/a key is case converted

The BS key is a single clear key

SPA key is the space bar

CRL key is cleared for all

8.8.7 Data transfer settings (see Figure 21):



(figure 21)

The baud rate and automatic transmission switch can be set in the data transmission setting option,The customer selects the corresponding baud rate according to the requirements of the connected equipment,When the automatic option is turned on, the measured data will be automatically transmitted to the related connected equipment, and the data on the optometer will be automatically cleared.

9 Use method (measurement):

Applicable population and contraindications

The target patients were adults, children and the eye diopters ranged from (-20 m-1 to+20 m-1).

This product is not suitable for neonatal eye measurement.

9.1 preparation before measurement:

9.1.1 Place the instrument on the liftable table top, open the stop switch to make the instrument in a free sliding state, and adjust the level of the instrument by adjusting the rubber foot pad.

9.1.2 The specified size of jaw support paper and printing paper shall be fixed on the jaw support with jaw support positioning nail and loaded into the printer.

9.1.3 Insert the power cord equipped with this instrument firmly into the power socket and check whether the local voltage matches with this instrument. (For 232 interface, please contact your local distributor or manufacturer)

9.1.4 Open the left power switch (green power indicator light indicates normal power supply) and the instrument enters the self-test program. After the self-test program is completed, go to the measurement main interface and wait for measurement.

9.2 Measurement and measured adjustment:

9.2.1 The surveyor adjusts the seat height and adjusts the display angle to an appropriate angle.

9.2.2 Arrange the measured person to sit on the measurement chair in a comfortable and relaxed posture.

9.2.3 Keep the measured person's natural sitting posture at the same height as that of the instrument by adjusting the lifting table top.

9.2.4 The measured person shall be arranged to place the lower jaw end on the jaw support, and the forehead shall naturally rest on the rubber pad of the forehead support (the face shall be kept parallel to the measurement window).

9.2.5 The measurer shall observe that the eye of the measured person is located at the mark of measurement window, and press the frontal support lifting button of panel keyboard to adjust the eye of the patient to keep the same height as that of measurement window.

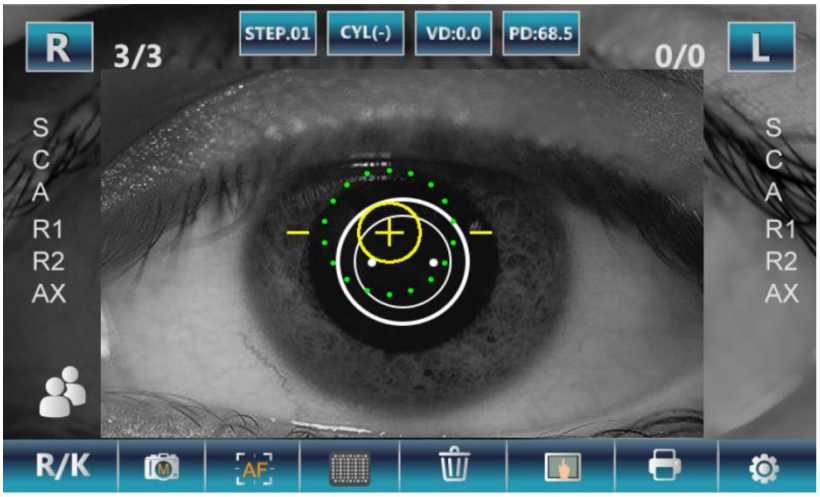
9.2.6 Move the sliding platform leftward and rightward by using the joystick, and observe whether the left and right eyes of the measured person can be included in the measurement range (for example, if the distances between two sides are asymmetric, the head offset of the measured person can be adjusted).

9.3 Measurement Note: The measurement alignment method of this instrument is that the corneal vertex coincides with the central measurement cross target:

9.3.1 Routine measurement mode:

The operator grasped the operating handle with his right hand, and slid the instrument sliding platform to the left so that the measurement window was approximately aligned with the orbital

position of the right eye of the subject. (see figure 23)



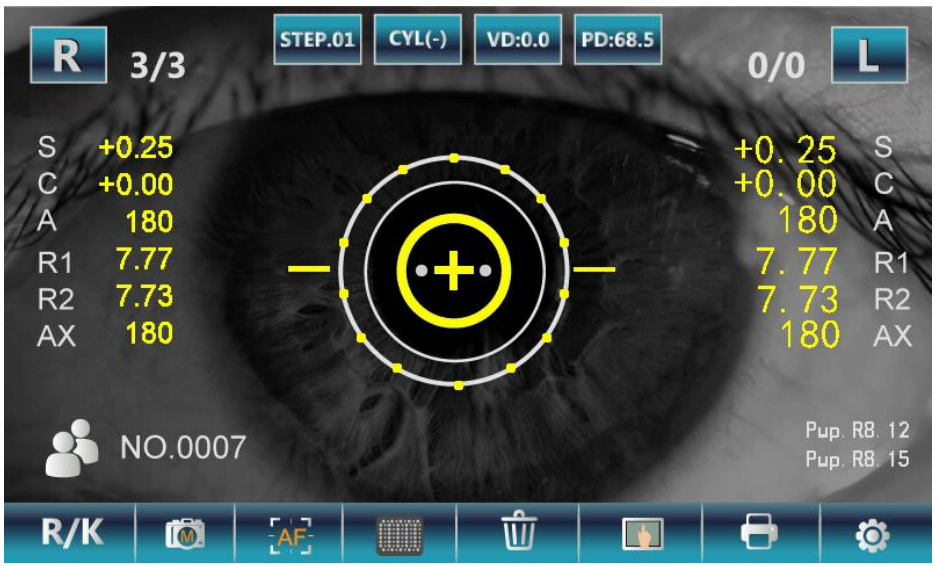
(figure 23)

Observing the position of the eye of the measured person on the display screen, adjusting the position of the eyeball up and down by rotating the operating rod, and simultaneously shaking the operating rod left and right to enable the yellow cross ring target to be aimed at the vertex of the cornea of the patient, and pushing and pulling the operating rod back and forth to enable the pupil of the eye of the measured person to be clearly focused in a central measurement frame. (The focusing accuracy can be confirmed by observing whether the two points in focus of the split image are level with the cross target). (see figures 24 and 25)

(Figure 24 in the direction away from the patient's eye) (Figure 25 in the direction close to the patient's eye)

It is suggested that the person under measurement keep his/her eyes wide open (covering the eyeball with the eyelid and eyelashes may affect the accuracy of measurement) and keep his/her eyes fixed on the right front.

Fine-tuning control lever, when the focus two points of the split image are horizontal to the cross measuring target and the yellow cross measuring target becomes thick and green (the measuring key is set to a, and the machine automatically measures; When the measurement key is set to M, the measurement button needs to be pressed),After the measurement lamp flashes (the black screen is brushed), the measured person is informed of the end of the measurement (the measured person does not need to see clearly the object image, and the measurement result is as accurate) and the measurement result will be displayed on the display screen (see Fig,26).



(figure 26)

Slide the instrument sliding platform to the right, and repeat the above steps to measure the left eye of the measured person.

After the binocular measurement is completed, the interpupillary distance is automatically displayed in the corresponding position. Select whether to print the measurement results according to the settings (the parameters on the display will be cleared automatically after the automatic printing or data transfer is complete).

9.3.3 measurement error prompt

During the measurement by the instrument, in case of patients with ptosis, eyelash interference, severe cataract, small pupil, keratopathy, and the non-coincidence of corneal vertex and pupil center, a prompt will appear when the measurement cannot be performed, please select the forced measurement mode (press the measurement key long enough) (see Figs,27–28).

(figure 2 7) (figure 28)

10 common troubleshooting and service information:

10.1 power indicator is not bright:

Check whether the local power supply is consistent with the instrument; check whether the power plug is loose and the fuse is open (please replace the fuse with the same specification 5a250v);

10.2 jaw can't lift:
Whether the jaw support is lifted to the limit position;
10.3 printer does not work properly:
Whether the printing paper is used up; Whether the print settings are correct; Whether there is print data;
10.4 sliding platform is not flexible:
Whether the stop switch is in the correct position and whether sundries enter the gap of the sliding table;
10.5 press the measurement key cannot measure data:
Whether the position of the eye is serious Not measuring whether the cross target is aligned with the pupil (the cross target becomes thick and green) Whether the fundus is seriously damaged;
10.6 measuring lamp is not bright:
After the measurement, the instrument will automatically turn off the measuring lamp and shake the sliding platform; the measuring lamp will automatically turn on.
10.7 If you have other questions, please contact your local distributor or manufacturer:

- If the fault phenomenon cannot be solved according to the simple fault phenomenon and the method shown in troubleshooting, please contact the agent or distributor of Anhui juyanxue technology development co., ltd for repair.
- Please provide us with the following information:

Instrument name: manual optometry instrument
Instrument number: serial number on the sign
Fault phenomena: be as detailed as possible (provided in the form of pictures or small videos);

(1) Provide limits for accessory repair:
The instrument provides service accessories to maintain the instrument function.
(2) Instrument handling:

- This instrument and its accessories will pollute the environment if discarded at will;
- Please contact a professional waste disposal company or contact a distributor before discarding this instrument.

11 Packaging, transportation and storage:

The storage condition is between-25 DEG C and+40 DEG C, and that transportation condition is between-40 DEG C and 70 DEG C; The relative humidity is between 30% and 75%; The air pressure is between 86 kpa and 106 kpa.

(1) There shall be packing list and instructions in the packing box.

(2) Product packages are not allowed to be shipped with inflammable, explosive and corrosive products; Loading should be neat, smooth, strong, do not allow super high, overweight; Transportation should be rainproof snow, sun, impact and fall prevention measures.

(3) The product packages shall be stored at normal temperature in a dry and well-ventilated warehouse, and shall not be stored together with chemicals, acid-base substances and other harmful substances.

12 environmental protection:

For scrapped stop using the instrument, should be in accordance with the requirements of the relevant local laws and regulations.

13 Random accessories (Table 1)

serial number	content	quantity
1	operating manual	1
2	dust cover	1
3	Lens dust plug	1
4	power line	1
5	Jaw paper	1
6	Lens wipe	1
7	form	1
8	fuse wire	2
9	Jaw support nail	2
10	simulated eye	1
11	Screwdriver 2 inch	1
12	Allen wrench M1.5	1