Auto Refractometer

User's Manual

Model:FA-100

Intellectual property statement

All dealers and users who use various models of ourproducts are deemed to have approved ourintellectual property rights, and no individual, company orenterprise may copy the technology and appearance of ourrelated products without permission.

If it is copied, its legal responsibility will be investigated!

This manual is forthe purpose of providing information. In actual operation, there may be changes without explanation. Our company will not be responsible for any direct or indirect damage caused by or

This product is a precision instrument, please handle with care! Please refer to the subsequent instructions on safety precautions in this manual.

Logo description:

⚠	Warning!In orderto avoid electricshock, do not open the instrument, only professionals can operate it.
⚠	Attention! Please consult the random file!
	In order to avoid potential harm to the environment and human health, recycle and dispose of it accordingto localregulations.
	Date of production
SN	serial number
I O	I and o represent ON and OFF of the powerswitch, respectively
	Type b application part
	Protective grounding
~	alternating current
Load 1Kg	The chin-rest load is 1kg
⚠	Reading instructions
FUSE	Fuse
CR1220	Button cell (internal)
S(D) C(D) A(°) R1(mm) R2(mm)	S(D)spherical power(diopter)C(D) cylindrical power(diopter)A (degree) cylindrical axis (degre R1(mm) Horizontal curvature (mm)R2(mm)Vertical curvature (mm)
	signal

Contents

Introduction of instruments

Brief Introduction

Scope of application: The Auto Refractometer is suitable for objectively measuring the refractive state of human eyes, including spherical power , cylindrical power, cylindrical axis,and interpupillary distance; corneal curvature radius, axial position of principal meridian and corneal diopter.

Tips: The refractive power measured by the Auto Refractometer can't be the only basis for optometric prescription, and the Auto Refractometer replace the Auto Refractometer and lens correction techniques of optometrists, but can only provide some reference for artificial optometry.

Applicable User: User who need refractive correction.

Structure: It consists of optical imaging system, control system and display, including software components(FA–100KV4.0).

Contraindications: This product is not suitable for babies to measure eyes

Pupil ring/corneal reflex ring

Fundus image

Measuring principle

The measuring principle of diopter of refractometer is to use infrared fundus reflection phase method, emit a beam of infrared light with specific wavelength, pass a standard target ring with parameter design through the cornea, lens, etc. of the examinee, and finally project it to the retina of the eyeball, and then reflect it back to the corresponding optical system of the instrument, and take an image through the image sensor. Because the refractive state of human eyes is different, the size and shape of the standard target ring on the retina will change.After image processing and signal processing, the spherical mirror degree, cylindrical mirror degree, and axial direction of the column mirror will be calculated. The measuring system adopts a rotary wedge mirror measuring device for diopter of human eyes. The principle of corneal curvature measurement of refractometer is to use the principle of corneal reflection to project two rings on the front surface of human cornea, and to calculate the curvature radius, axial position of principal meridian and corneal diopter of human cornea by analyzing the changes of the reflected image of the front surface of human cornea.

In order to measure accurately, it is necessary to aim the measuring window of the instrument at the pupil of the eye, and there is a circular target on the screen of the Refractometer to conveniently aim at the pupil during measurement.

Structure diagram of Refractometer

Forehead–rest:silicone rubbe

Chin–rest: ABS plastic

On Screen Display

R/L — Right eye/Left eye. After pressing the button, the machine will move to the selected irection. The key is in orange showing the machine's working state.

Lifting of the chin rest. Move the chin up and down.

The upper body forward and back. Move the machine closer or farther to the patients' eyes.

+/− — Cylindrical symbol. Switch the cylindrical lens to positive(+),and the measurement shows that the astigmatism is positive; The cylindrical is negative(−), and the measurement shows that the astigmatism is negative; Mixed astigmatism(+/−),measurement shows that the sign of the spherical mirror value is consistent.

FOG/FOG — Times of cloud map guidance.3 times or 1 time

Packkey. The chin rest and the machine restored to the packing position.

Measurement of pupil diameter. Measure the pupil diamet

System settings. Enter the settings menu.

Manual measuring

Clear button to eliminate the measured data and reset it.

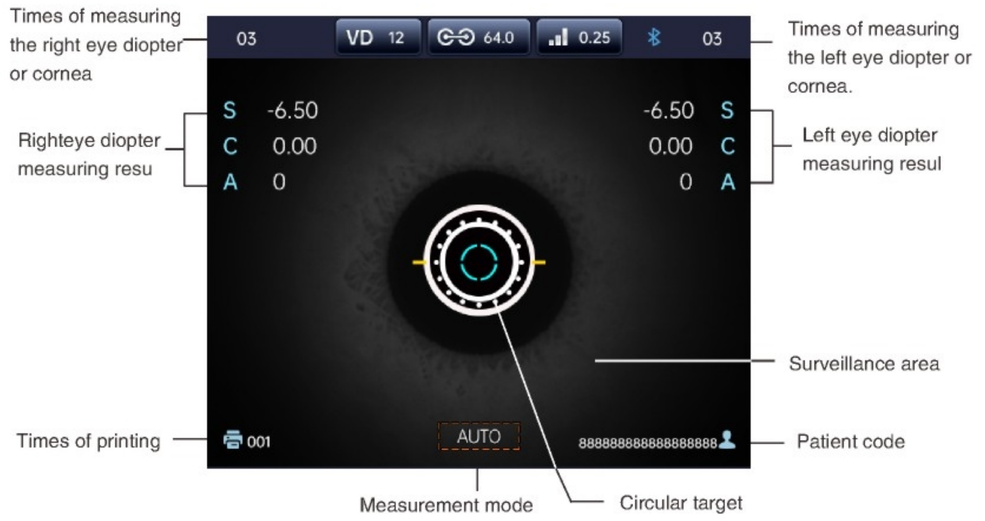
Record of measurement data.

Print button to print the measured data

Display measuring ring. Thefundus circular image collected by the instrument is displayed to judge the validity ofthe measurement results.

REF — Current Refractometer mode

A M / A M — Current measurement mode.M is the manual measurement mode, and A is the automatic measurement mode.



VD 12 — Vertex distance selection key. The four options are: 0mm,12mm, 13.75mm and 15mm respectively. When wearing contact lens, select 0mm. Choose 12mm,13.75mm or 15mm when wearing ordinary frame glasses. Or press the setting button to select.

64.0 — Pupil distance value Displays the size of the pupil distance value.

0.25 — Key of choose Measurement interval. Two measurement intervals of 0.12m^{-1}(D) and 0.25m^{-1}(D)can be selected.You can also enter the system settings.

Key of choose data connection mode

Patient code.Enter up to 20 characters.

- The LCD screen is a touch screen.Do not use any sharp tools, such as ballpoint pens, etc.
- You can only touch one dot on the LCD screen at a time.
- Touching the monitoring area can control the machine move to the specified position,and continuous touching can keep the machine moving untilit you stop touching.

System settings

镜眼距 —— Choose 0mm when wearing corneal glasses, and choose 12mm, 13.75mm or 15mm according to the height of nose bridge and the depth of eye socket when wear ingordinary frame glasses,Asians generally choose 12mm.

柱镜 —— Select–the measurement result is negative astigmatism, select+the measurement result is positive astigmatism, and select+/–the measurement result shows that the signs of spherical mirror values are sustained.

间隔 —— The measurement interval can be 0.12m^{-1}(D) or 0.25m^{-1}(D).

轴位间隔 —— Axis measurement interval can be selected from 1 or 5.

屏保 —— There is no screensaver when "Off" is selected; Select 5 or 10, do not operate the instruments, after 5 or10 minutes, enter the screensaver state and touch the screen when using it again.

蜂鸣器 —— The"On" button, touch screen beep, "Off" mute

颌托高度 —— The default is "low", which is suitable for most people being measured. If the face contour is small or child, can touch screen to choose "medium" or "high".

瞳距 —— The optional range is 58~74, and the default 64 is suitable for most adults. If the pupil distance between the eyes of the measured person is small, press "–" to reduce the pupil distance, which can focus faster and shorten the measure–ment time. If the pupil distance between the eyes of the measured person is large and the upper body can't move to the center of the pupil, press "+" to increase the pupil distance.

待机位置 —— "Left" Measure the left eye first after each reset;"Medium" measurement of a single simulated eye;"Right" measure the right eye first after each reset; After the "last time" reset, which side was stopped last time, and which side of the eye was measured first

测量模式 —— You can choose to measure only one eye or both eyes. Touch the place to be adjusted when the date is adjusted, and a white adjustment box will appear. Press the up and down keys to adjust.

日期 —— Touch the place to be adjusted when the date is adjusted, and a white adjustment box will appear. Press the up and down keys to adjust.

时间 —— The method of adjusting time is the same as above.

打印 —— Automatic can be selected,and the measurement will be printed automatically;Select Manual. Afterthe measurement is completed, touch the print key to print the measurement results.

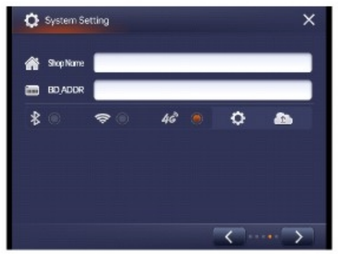
打印数据 —— You can choose to print the last 3 or last 10 measure–ments.

打印后清除 —— You can choose to open it, and the measured data will be automatically cleared after printing; Select "Close",and the data after printing will not be cleared.

打印浓度 —— Default density: 80%. You can increase or decrease intensity according to the printing de nition requirements.

打印切纸 —— You can choose to cut all or half of the printing paper after printing

波特率 —— Set the baud rate value



—— Bluetooth

—— WIFI(optional)

—— 4G(optional)

—— Setting

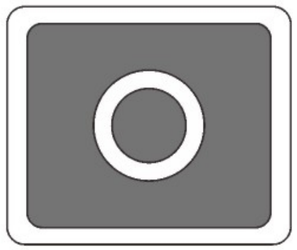
—— Transmission

Three representations of corneal measurement data.

Liquid crystal display

When using this instrument, the operator can rotate the screen up, down, left and right As shown above which makes it more comfortable to watch the contents displayed on the screen from different angles.

Observe fundus image



Complete fundus circle

Incomplete fundus ring

after the measurement is completed,the fundus image can be displayed by touching the "G" key,and the complete ring indicates that the measurement results are credible; If the ring is incomplete, the measurement results may error and need to be re–measured.

Incomplete ring may be caused by blinking or eye movements; Sometimes because it's not aimed at the pupil; Sometimes because the reflected light from the fundus is too weak; Sometimes there is dust on the measuring window, please gently wipe it off with a clean mirror cloth or blow it off with an ear washing ball; Sometimes there are fingerprints or grease on the measuring window. Please gently wipe it with a dean mirror cloth or lens paper.

Tips when measuring

ERROR!

–During the measurement, the measured person blinks or moves his eyes, resulting in measurement errors, and the screen will display errors;

–Empty test or not aimed at the eyes, display error;

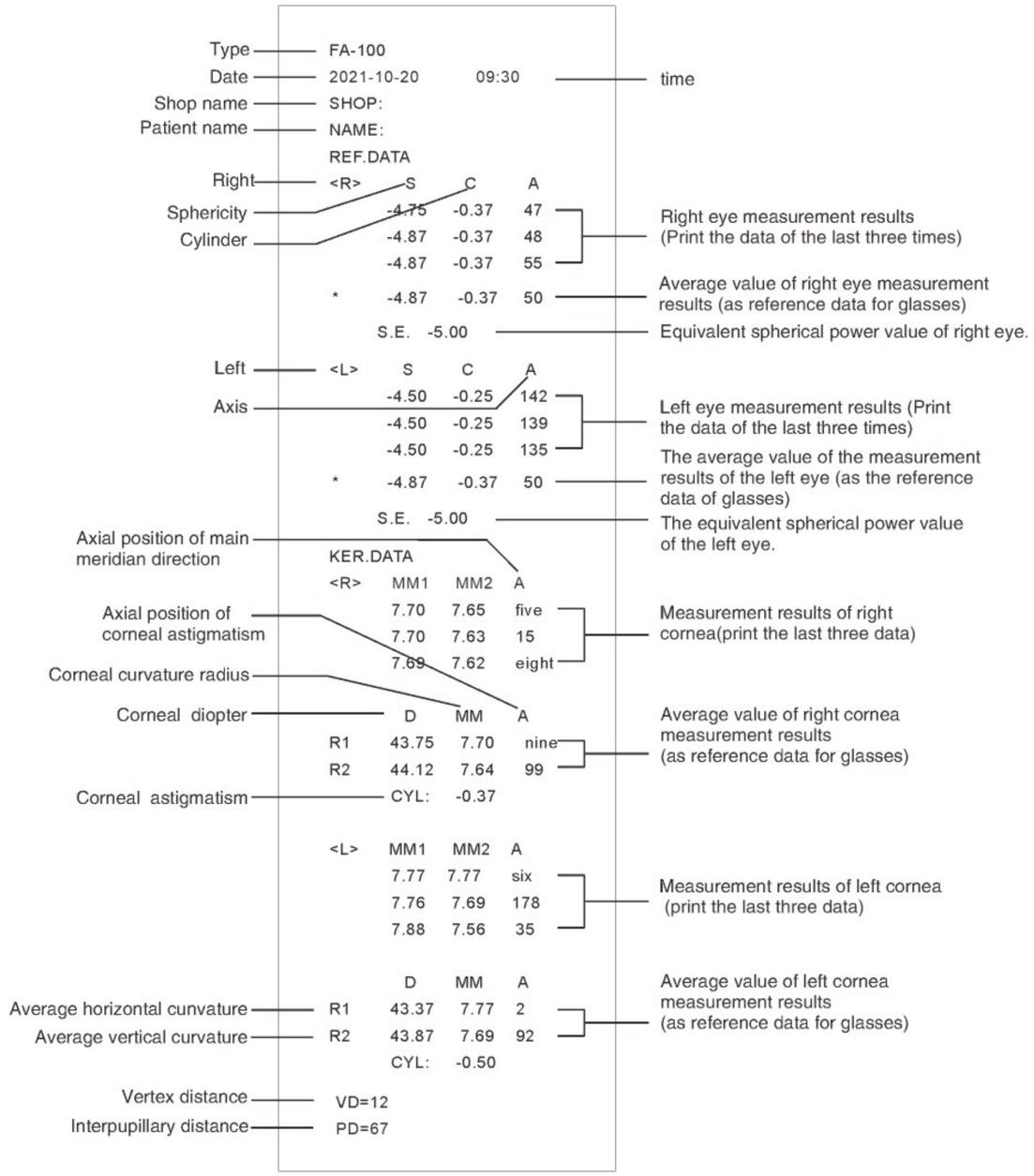
–Fundus image signal is too weak, display error;

–When the eye measurement results exceed the measurement range, an error is displayed.

Pupil or corneal diameter measurement

See pupil or corneal diameter measurement mode for details.

Print results



Vertex distance: the distance from the apex of the spectacle lens to the apex of the cornea.
Pupil distance: the distance between the centers of the two pupils of the human eye.
Number of times: according to the parameter setting, print results can be selected three times or ten times.

Install printing paper

1. Push the printer switch outward slightly.

2. Open the printer cover.

3. Load new thermal printing paper (pay attention to the direction).

4. Push the printer cover up and snap it back. (Leave about 3cm of printing paper outside)

Note: Do not open the printer cover when the printer is working to avoid injury. If the printer fails, cut off the power supply before deal with it to avoid injury.

Replace the fuse tube

1. Clamp the flat screwdriverinto the slot of the fuse box, and then pull out the fuse box slightly.

2 . Take out the fuse box and push out the fuse slightly to the lower left and lower right respectively (as shown by the arrows in the figure above).

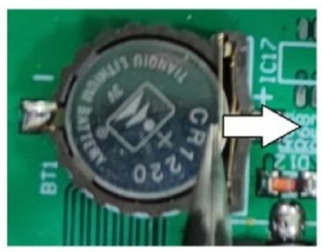
3. insert the new fuse into the bottom of the fuse box to the upper left and the upper right respectively (as shown in the figure below).

4. Push the fuse box into the fuse Socket,

Note: Please replace the fuse with the power cord unplugged.

Disassembly and installation of battery

1 、Disassembly of battery: shutdown state, Open the head shell of the instrument indicated by the arrow, push the spring piece with tweezers in the direction of the arrow so that the spring piece is slightly bent,and then the battery will automatically bounce.

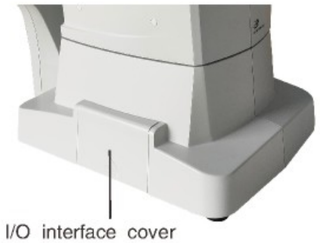


2、Installation of battery: shutdown state, Put the positive electrode of the CR1220 battery upward, and install the battery in the battery holder obliquely from left to right,and then press the battery slightly downward, so that the battery can be caught by the buckle, that is, the battery is installed in place.

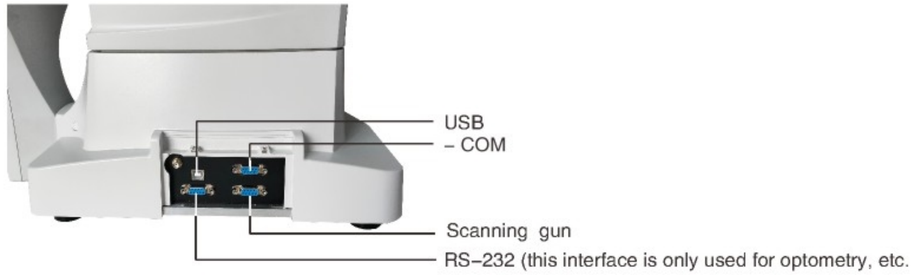
Note:

1. Take out the battery when the instrument is not in use for a long time.
2. Using other types of fuses and batteries will reduce the safety of the equipment.

Input/output interface



Hold the I/O interface cover as shown in the figure above, and take the I/O interface coverout and up slightly.



USB port and COM port are for the exclusive use of manufacturers, and are not connected with other devices.

Function of printer indicator light

Printer indicator light: the green indicator light is always on; if the paper shortage indicator light flashes, the shutdown indicator light goes off.
Green light means on. Flickering light means the paper shortage. Light off means shutdown.

Network communication

Bluetooth support (optional)
4G support and Wifi(optional)

Unpack and check

Unpack the box

Unpack the instrument and remove the packing materials for transportation. Keep the packing box and packing materials in case you need to repack the instrument later.

Unpacking steps:
Remove the tape from the outside of the packing box
Take out the plastic filler
Get out the packing list

Check the contents of the packing box

The contents of the packing box should include:
Refractometer
User manual, product certificate, product warranty card and product test certificate.
Attachment details:
1.Printing paper
2.Insurance tube
3.Dust cover
4.Mirror cloth
5.Power cord
6.Scanning gun(optional)
Note: See packing list for full list

Installation

Installation

Hold the fourcorners of the instrument and place it on the workbench smoothly (the handling method is shown in the above figure).

Note: Please be careful to avoid pinching your hands when lifting the instrument.

Connect the power cord

Please make sure the power switch is in the O (off) position;

One person tilts the instrument to the left with both hands, while the other person inserts the plug into the power socket (as shown in the above figure) and connects the power cord to the power socket of the workbench.

After the installation is complete, turn on the power switch, the instrument starts up normally, and enters the test working state,whtich means the installation is successful.

Note: the ground lead in the socket should be reliably grounded.

Installation environment

Temperature:10 ℃~40 ℃
Relative humidity:30%~75%
pressure: 860hPa~1060hPa

Operation method

Posture adjustment

Adjust the workbench to make the measured person sit comfortably on the chair;

Let the measured person put his chin on the chin rest, with his chin close to the position of the chin rest, his forehead against the forehead rest, his head upright, and his eyes looking straight;

Touch the center area of the LCD screen or the lifting button of the LCD screen to adjust the height of the chin, so that the eyes of the measured person are roughly aligned with the measuring window of the host.

Preparation before operation

Place the instrument on a stable workbench;
Connect the power cord correctly,and press the power switch (I) to display the measurement interface on the screen;

●The default system settings are suitable for most of the testees. If there are special circumstances or the optometry capture time is shorter, please enter the system settings, and the settings are in line with the indicators of the current testee.(Please refer to the system setup section for details)

Note: Avoid using this instrument in the environment of direct sunlight or strong light, otherwise it will cause measurement error.

When operating the instrument, if the face or hand of the testee touches the measuring part of the instrument, clean it before measuring.

The measurement times of each eye should be not less than 3 times.
If you doubt the measurement result of the instrument, you can use the standard eye test instrument.

Automatic measurement mode

1. Touch to select the measurement mode as automatic measurement mode (A), and AUTO will be displayed on the screen.

2. When the pupil of the measured person appears on the screen, touch the pupil center, and the upper bodywill automatically move to the pupil center and focus, and then the system will start automatic measurement.

●If there is no pupil image in the monitoring area, adjust the left, right,up and down position of the upper bodyby touching the monitoring area, and touch the Chin–rest lifting key to control the chin–rest lift to make the pupil appear in the monitoring area. If it still fails, touch under the condition that focus basically aligned as shown in the figure below the Measurement key to force start measurement.

●If the automatic measurement can't be completed, it may be due to the incomplete display of the focal spot in the center of the pupil of the measured person/the front and back of the upper body too far away from the focus/the eyelashes shelter and interference, etc. so, it is necessary to touch the key to fine–tune the upper bodyto focus the pupil, and then trigger the start Automatic measurement again.

Chin–rest lifting key

●When the upper body moves to the up–down or left–right limit position,yellow color limit signs are displayed at the corresponding four bottoms on the screen, as shown in the following figure.Just touch the monitoring area in the opposite direction until the pupil image appears in the center of the screen.

●When the upper body reaches the extreme position of the forward direction, the screen displays the words "too close".
When the upper body reaches the extreme position in the backward direction, the screen displays the words "too far". Use the upper body forward and backward keys to adjust the upper body position, until the pupil image is displayed at the center of the screen.

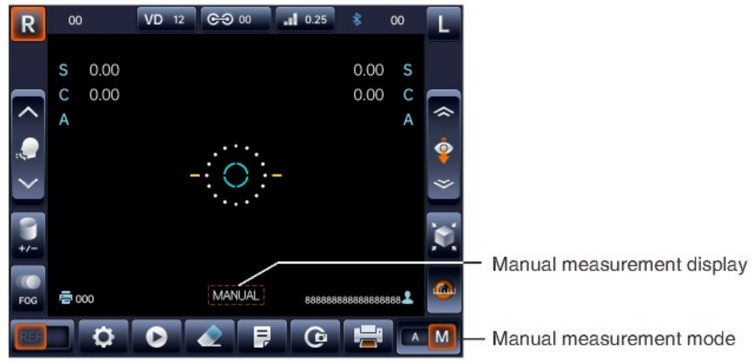
3. In the automatic measurement mode, after one eye completes the measurement, the upper body will automatically move to the center of the pupil of the other eye and complete the automatic measurement.(Note: the system sets eye measurement mode to select both eyes)
●If it can't be complete the automatic search and start the automatic measurement (for example, the corneal condition can't be met), refer to the first step above to complete the automatic measurement of the current eye.
●If the Instrument moves or the interference occurs during the measurement process, and the measurement result is suspected to be unreliable, click Clear key to clear the measurement result, and then reset to measure again.

4. After the automatic measurement is completed, the measurement results will be displayed on the screen , and the measurement results can be printed.

Note:
● If the upper eyelid or eyelashes of the measured person cover the pupil, the automatic measurement mode may not be implemented. At this time, the operator should remind the measured person to open his eyes as much as possible, or the operator can lift the measured person's upper eyelid.
● If the patient blinks frequently or has keratopathy, the automatic measurement may not be implemented. If it can't implemented, choose manual operation.
● If the measured person wears makeup or eye shadow on his eyelids, the automatic measurement may not be implemented. If it can't implemented, select manual operation.

Manual measurement mode

Touch to select the measurement mode as manual measurement mode(M), and MANUAL will be displayed on the screen.
1. Touch the R right eye key or L the left eye key on the screen to select the patient's right eye or left eye ,and the orange key icon indicates the current measurement position . Take the right eye measured first as an example .



2. When the measured pupil is displayed in the monitoring area, touch the central position of the pupil image in the monitoring area and move the upper body to the center of the pupil.

3. Observe the target ring in the monitoring area and touch the upper bodyforward/backward key, adjust the front and back position of the upper body to make the green cross mark appear in the brightest and clearest target ring, the focus is completed.

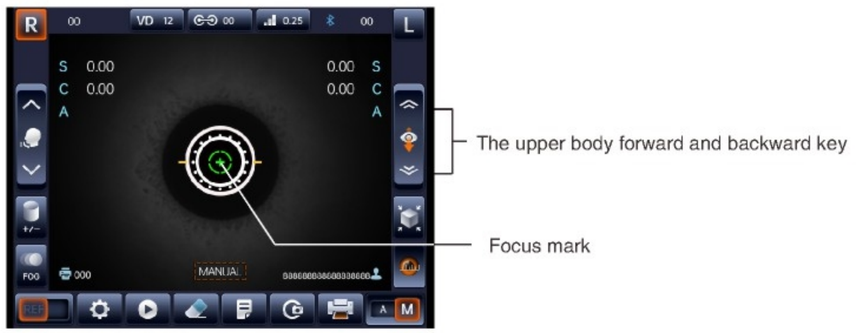


figure 1

●When the ring shown infgure 2 is displayed at the target ring of the monitor screen, when touch the key to fine–tune, the screen will appear the target ring as shown in Figure 3, and continue to touch the key to make the upper body back until the target ring is the brightest and clearest, and the focus alignment mark appears (as shown in Figure 1).

When the ring shown in Figure 4 is displayed at the target ring of the monitor screen, when touch to fine–tune, the screen will appear the target ring as shown in Figure 5,and continue to touch the key until the target ring is the brightest and clearest, and the focus alignment mark appears (as shown in Figure 1).

Figure 2

Figure 3

Figure 4

Figure 5

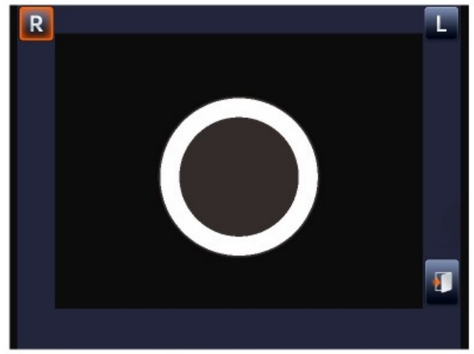
4、When the brightest and clearest focus alignment mark of the target ring appears, the touch measure key to complete right eye measurement and right eye measurement value is displayed on the screen.

Note: When the focus alignment mark does not appear, touch the measurement key to perform measurement, but to ensure the measurement result is correct, should touch the measurement key to complete the measurement after focusing.

5、Start measuring the left eye and touch the scree Left eye key, the upper body moves to the position of the left eye of the measured person. Operation and Measuring the right eye is the same. After the measurement, the screen displays the measure–ment results of the left and right eyes.

Eye fundus image

● After measuring, can touch to display measure ring key to enter the funds display image interface.
● Touch R/L R/L Righteye/lefteye key, yellow means selected, which can swich between right eye ring and left eye ring
● Touch Key can switch funds image and corneal fundus image .



Fundus image

Corneal image

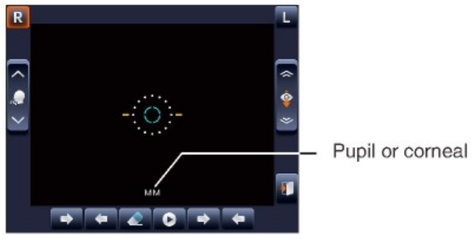
Touch Key to return to the measurement interface.

Display all measurement data

●Refractmeter is initially set to measure the data for three times, and only the latest measurement data is displayed on the screen. Touch measurement data record key to enter the data display interface and you can view the measured data for ten times.
● Touch key to switch the Vertex distance ,measurements data change accordingly.Touch key to switch the cylinder symbol , measurements data change accordingly. Touch key to switch the measurement distance ,measurement data change accordingly.
● Touch in the upper right corner,return to the measurement interface.

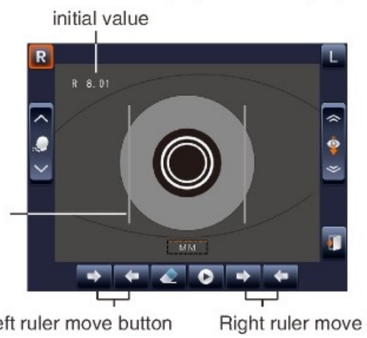
pupil or corneal diameter measurement mode

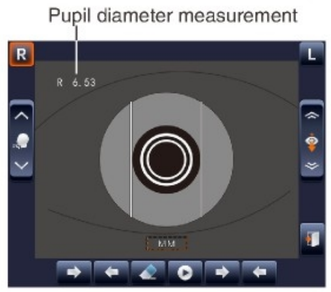
1. The pupil or cornea diameter can be measured in either the automatic measurement mode or the manual measurement mode. In the automatic measurement mode, touch The pupil or corneal diameter measurement key on the screen, enter the pupil or corneal diameter measurement interface, And touch the pupil center, The machine can automatically recognize and move the upper body to the focusing position and capture corneal images; In manual mode. touch , The pupil or corneal diameter measurement key on the screen, to enter the pupil or corneal diameter measurement interface, you need to manually touch the operation key to move the upper body to the focus position and touch The measurement key captures corneal images.



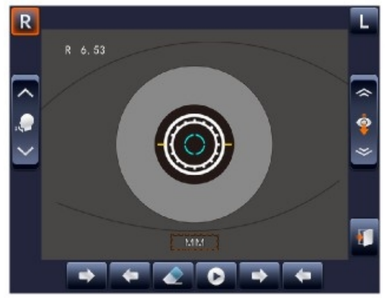
2. Take measuring the pupil diameter as an example, first measure the right eye. Touch Right eye key, right eye key shows yellow selected state.Adjust the measured person's eye image and make it to be displayed at the center of the monitoring area, and the pupil and corneal diameter image will be automatically shot in the automatic measurement mode; Manual measurement mode requires touching The forward and backward keys of the upper bodyto fine-tune the focus to make the image the clearest. The operation method is the same as the above description of automatic measurement mode or manual measurement mode.

3. In manual measurement, touch Measure key to complete the image shooting operation of the pupil and corneal diameter of the right eye. Touch / Move the left and right ruler line keys to move the left and right white ruler lines so that the ruler lines are aligned with the pupils or corneal edge position, and the right eye pupil or corneal diameter value is displayed at the top right of the screen.

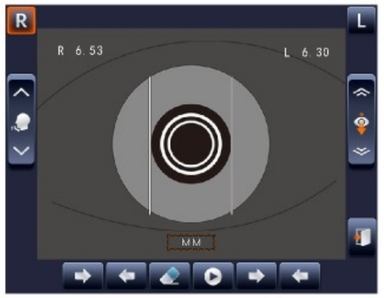




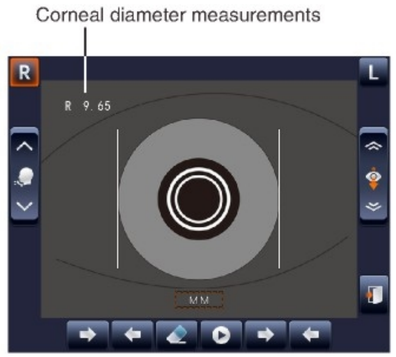
4. Take the measurement of pupil diameter as an example, touch Left eye key, the left eye key displays the yellow selected state, and the upper bodymoves to the lefteye position and operation method are the same as measuring the right eye.



5. After the measurement is complete, the screen displays the measurement results of the left and the right eyes at the same time. If you need to re-measure, press the clear key. If you return, touch the key to end the measurement.



To measure the corneal diameter, move the ruler to both sides of the cornea, as shown below.



Technical indicators

Equipment classification:
Classl, Type B,non–AP/APG
equipment
Operation mode: continuous operation.
measuring range

Measurement mode	parameter	measuring range	space
Measurement of refraction	Sphericity (s)	-25m-1(D)～+25m-1(D)	0.12m-1(D)/0.25m-1(D)
	Cylinder	-10m-1(D)～+10m-1(D)	0.12m-1(D)/0.25m-1(D)
	Axis	0°~180°	1°
	Pupil distance (PD)	5mm~90mm	1mm
Measuring correa	Corneal curvature radius	5.0mm~10mm	0.01mm
	Corneal diopter	33.75m-1(D)~67.50m-1(D)	0.12m-1(D)
	Corneal astigmatism	0m-1(D)~-15m-1(D)	0.12m-1(D)
	Axial position of corneal astigmatism	0°~180°	1°

- Vertex distance(VD):0 mm,12mm,13.75mm,15mm
- Chin–rest lifting
- Display:10.4"color LCD screen with adjustable display angle.
- Fogging image:follow–up cloud map(automatic fog vision system)
- Eye alignment mode: pupil circle
- Tracking mode: automatic tracking up, down, left and right.
- Eye focus mode: Auto focus mode.
- Printer: Thermal printer
- Power Supply:100V–240V ~ 50Hz/6QHz75VA
- Type/specification of insurance pipe: F3AL250V
- Waterproof grade: IPXO, this instrument has no waterproof function
- Working environment: temperature:10 ℃~40 ℃
  relative humidity: 30%~75%
  pressure:860hPa ~ 1060hPa
- Transportation and storage environment:temperature:–40℃~+70℃
  pressure:860hPa~1060hPa
  relative humidity: not more than 90%
- Size: 287mm ~ 332mm(W) × 431mm ~ 479mm(D) × 489mm ~ 654mm(H)
- Net weight: about 19.5Kg
- Gross weight: about 25.8Kg

Safety matters and instrument maintenance

Safety precautions

- The AC voltage should be 100–240 AC.
- Do not place heavy objects on the instrument to avoid damage to the casing
- If you stop using it for a long time, you should cut off the power supply.
- Keep the instrument and surrounding air clean, and it is forbidden to be exposed.
- Handle with care when moving the instrument.
- Do not open the casing without the consent of our company, and do not directly touch the LCD screen withsharp objects or hard objects.
- It is forbidden to wipe the casing surface with chemical reagents.

Provide appropriate protection during installation to prevent harmful interference. This instrument generates high–frequency pulse energy in use. If it is not installed and used according to the corresponding requirements, it may cause harmful interference to peripheral equipment. It can be judged whether it will cause harmful interference to other equipment by turning on or off the instrument. It is hoped that the operator can solve the interference problem by one or more of the follow ing ways:
–Adjust the direction or position of the host.
–Increase the installation distance between this instrument and other equipment.
–Connect the power plugs of this instrument and other equipment to different power sources
–Consult the manufacturer or local maintenance department for help.

- The service life of this instrument 7 years, and the production date is shown on the back cover.
- Do not place the Refracto meter in a place where it is difficult to disconnect the power supply from the network.

Network security

- The software runs in the embedded hardware environment without operating system.
- Connect the RS–232 interface to Bluetooth module, scanner, 4G and Wifi actually.

Instrument processing

- When handling instruments or accessories, please comply with local regulations on waste recycling. In particular, please recycle button cell according to local laws and regulations.
- When handling packaging materials, please recycle them according to local laws and regulations.

working environment

●When used in optical shops, ophthalmology and other environments, this instrument will cause slight electro–magnetic interference during operation. When the Refractometer is working, try to reduce the use of communica–tion and other equipment, and at the same time, avoid using the Refractometer in a strong magnetic field environment to prevent inaccurate data collection and analysis caused by interference, which may affect the measurement results.

Maintenance

●If there is dust on the measuring window, please gently wipe it off with a cleaning cloth or blow it off with an washing ear ball;
●If there are fingerprints or grease on the measuring window, please gently wipe it with a cleaning cloth or lens paper;
●The chin rest and forehead rest should be wiped with medical alcohol 20 times before each use;
●Turn off the power switch regularly every month, unplug the power cord, wipe the appearance of the instrument with clean wet cloth or soapy water, and keep the surface of the instrument clean.
●Our company can provide circuit diagrams, component lists, illustrations, correction rules, or other necessary materials for the repair of instrument parts according to customer requirements.
●Check whether the power cord is loose or damaged, and whether the instrument is placed stably; Check whether each parameter setting meets the requirements.

Examine and repair

The fuse blows immediately after the power is tur nedon.	Check whether the power supply is in the range of 100V–240V?
The error of standard eye time measurement is large.	•Improper installation of standard eyes? •Is the Surface of Standard eye glass dirty? •the measuring window is polluted? •Is the outer surface of the lens of this instrument dirty?
Astigmatism measurement is large .	Are your eyes squint?
The measurement results always show ERROR, or the fund us circle is incomplete.	• Is it aimed at the pupil? • Do you blink or move your eyes? • Eye lesions? • Is the outer surface of the lens of this instrument dirty?
Lack of paper	Replace thermal printing paper.

●If the above problems cannot be solved, or there are new problems, please contact the seller or our company.
●In addition, other maintenance is not required by the user.