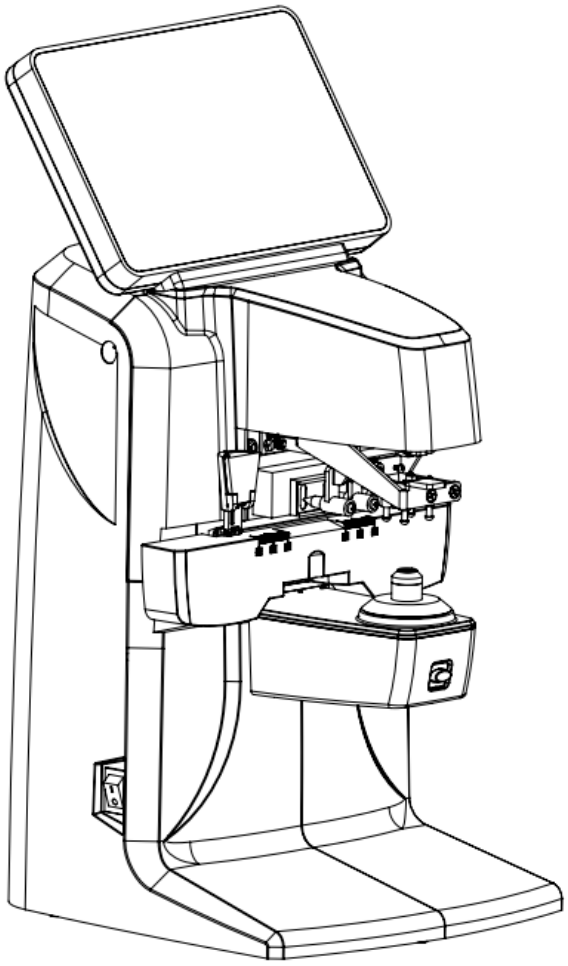
Auto Lensmeter

User Manual

(TL-6900)



Ningbo Ming Sing Optical R&D CO., Ltd

BEFORE USE, PLEASE READ THIS MANUAL.

To ensure the auto lensmeter better serve you, please read this manual carefully before use.

The device complies with IEC60601 and UL Standards, in order to use this device properly and safely, please read the user manual carefully and thoroughly understand all the operating procedures before using the device. At the same time, keep this manual handy for verification.

If there is any problems during use of this device, please contact us or your local authorized dealer.

This manual is also used as a training reference manual. To make sure the best performance of the new device, please read this manual carefully and operate the device according to the procedure in it. If you need additional copies or any questions about the device, please contact our company or authorized dealer.

The information contained in this manual has been confirmed before publication and product models can be changed without any prior notice. Ningbo Ming Sing Optical R&D Co., Ltd. reserves the right to change the product contained in this manual without notice. The sold products do not involve with such changes.

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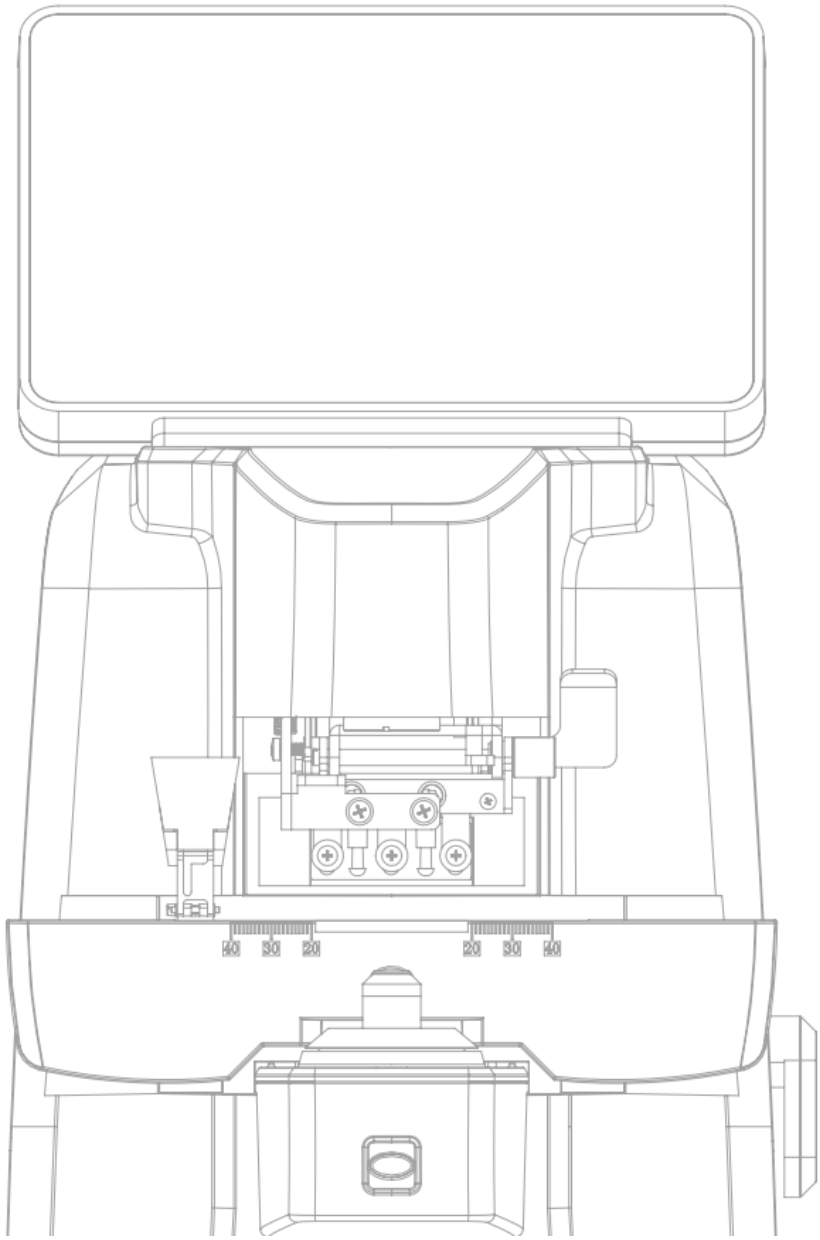
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1. Introduction



TL-6900 auto focimeter (lensmeter) manufactured by Ningbo Ming Sing Optical R&D CO., Ltd is for eyeglass lens and corneal contact lens (contact lens) vertex power and prism power measurement. It can also be used for cylinder (with astigmatism) lens axis direction, the optical center and axis marking for uncut lens, as well as the fitting effect of the lens on the frame. The device is mainly composed of 3 parts: display system, measurement system and export system.

The display includes 7inch true color capacitive LCD touch screen, with high sensitivity and clear image display to improve user experience.

The measurement system includes optical bench, lens holder system, marking system, lens bench, PD measurement system. There is manual reading button under the lens bench.

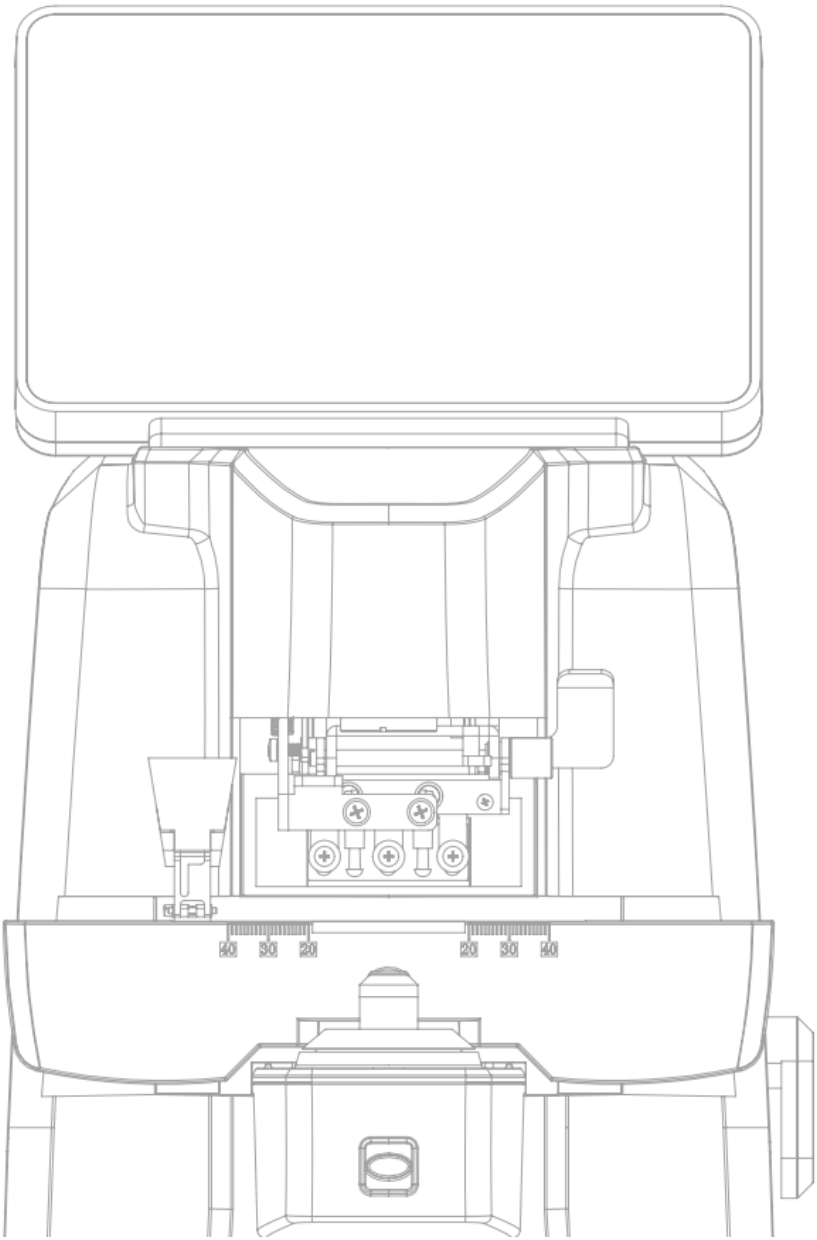
The export system includes the printer module on the right side of the device, and the RS232 interface and TF card slot at the bottom part of the device.

The main features of the device are:

- Can measure single vision lens, multi vision lens, progressive lens and corneal contact lens (contact lens)
- Can measure pupil distance and pupil height
- Can measure the lens visible light and UV light (central wavelength 365nm) transmittance rate
- Digital display, reading precision up to 0.01D
- Equipped with a good performance, low noise, high resolution thermal printer
- Equipped with Bluetooth, RS-232 port and WFIF interface for convenient connection with other devices.
- With multiple options for measurement functions, such as auto recognition, auto reading, auto R/L switch and auto ADD etc
- Screen tiltable for easy operation whether sitting or standing

TL-6900 focimeter (lensmeter) executes O/NEY 06-2004 enterprise standard, which meets People’s republic of China Optics and Optical instruments - Focimeters standard requirement.

2. Safety Precautions



2.1 Security identity

In this manual, words used to indicate the security alert degree or level are defined as follows:

⚠ **CAUTION** —— Indicates a potentially dangerous situation, which if can not be avoided, may result in slight or moderate injury or property damage. (Under certain conditions,even if the conditions for caution are also likely to lead to serious damage. So safety precautions must be strictly abide by the moment.)

2.2 Precautions before use

⚠ **Caution**

- Do NOT open and touch the device interior part, or it may cause electric shock or device malfunction.
- Please use the specified power supply and voltage. If the voltage is too high or low it the device may not work properly or cause malfunction.
- DO NOT put heavy objects on the power cord. Damaged power cord may cause short circuit, fire or electric shock.
- Immediately replace the power cord with new one if the metal cord is exposed, to avoid fire or electric shock.

2.3 Storage

⚠ **Caution**

- DO NOT place the device in a damp place or a place with poisonous or corrective gas or liquid.
- Avoid storing the device in a place with direct exposure to the sunlight and maintain proper temperature and humidity for the storage of the device.
- Note：when the device storage place has abrupt temperature change, the optical components inside the device may not be able to work like usual. Just put the device in the environment temperature for 3-10 hours it will work again.

2.4 Movement of the Device

⚠ **Caution**

- Do not pull the power cord or cables violently, or it may cause device malfunction or injury to others.
- Carry the device on the bottom to move the device, DO NOT lift the device by the screen, or it will damage the device or cause injury.

2.5 Installation of the device

⚠ **Caution**

- Do not install the device in a damp place. Water leaking inside the device may cause electric shock or device malfunction.
- Please install the device firmly and level. If not installed firm the device may fall down and causing device malfunction and injury to others.

⚠ **Note**

- DO NOT install the device in a place exposed to direct sunlight or use the device near incandescent light. Places with reflective surfaces such as mirror, glass display cabinet and polished table top are not suitable for installation of the device, because in such environment the machine may not work normally or has same error.
- Please do not use this device at places that are on the ventilation path of fans and air conditioner. Dust blown into the device will lower the device measurement accuracy

- Do not use the instrument in humid, hot or dusty environment, such environment will have adverse influence on device.

2.6 Wiring the device

⚠ **Caution**

- Please do not over load a power panel, or it may cause over heating or fire.
- The power supply to the device must be grounded for human and device protection.

2.7 Safety precaution after use

⚠ **Caution**

- When not in use, turn off the device and put on the dust cover. Connect with power for long time will shorten the use life of the device.
- If not covered with the dust cover, the dust falling onto the device will affect device measurement accuracy.
- If not in use for a long time, please unplug the device for the prevention of fire.

2.8 Precaution for Maintenance

⚠ **Caution**

- When adding ink. Please pull out the ink box and place it on a flat table top in case the marker system will hurt your finger.

⚠ **Note**

- If your device is not working and need to open the cover to fix, please contact with our company or your dealer first. Our company will not be held liability for the device malfunction when user disassemble on their own.
- Please do not scratch the protective glass under the lens support. Scratches on the protective glass will lower the measurement accuracy and reliability.

If the device is not in use for certain period of time, please take out the battery. The device battery (with electrode sign) replacement must be conducted by technician staff of Ningbo Ming Sing Optical R&D CO., Ltd and other authorized personnel.

⚠ Caution Lithium battery replacing method	Lensmeter (lithium battery:CR2032 3V 225mAh) ✓ Prepare a cross screwdriver. Remove the covers; ✓ Find the button battery on the motherboard; ✓ Press the clip on the battery base, and take out the battery when it popup; ✓ Take a new battery, side with “+” facing out. Then press it gently into t he battery base.

2.9 When accident happens

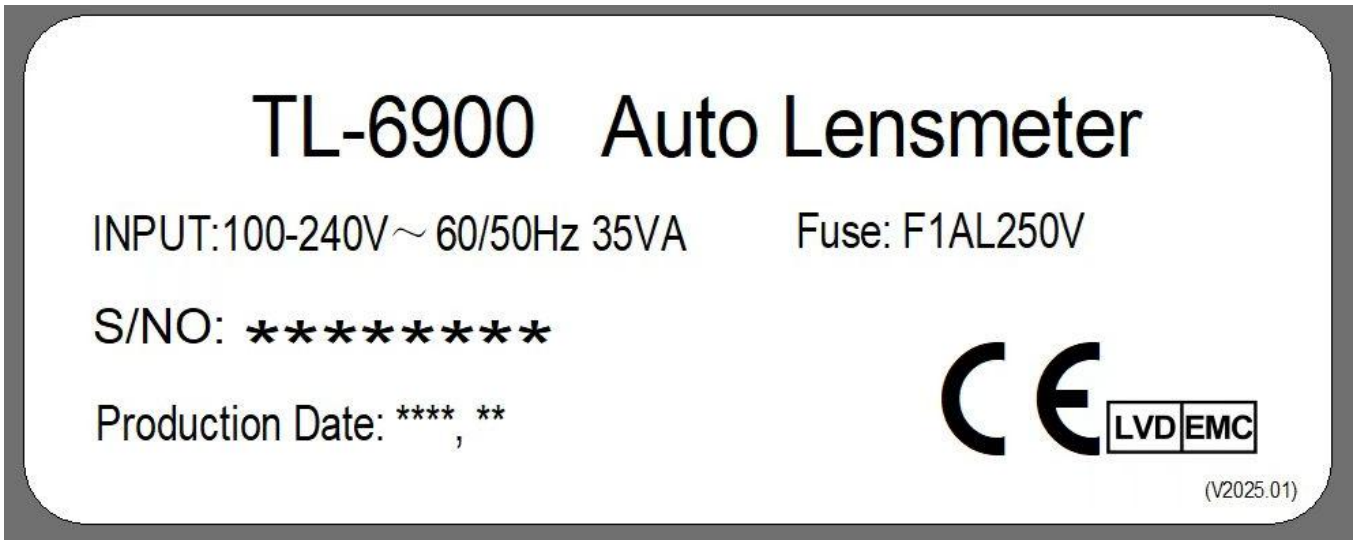
⚠ **Caution**

- When the LCD screen is broken, knock it into pieces and wash off the liquid crystal with isopropyl alcohol and then burn it.
- When your hand touched the broken LCD,wash your hand immediately.

2.10 Product label

To ensure user safety during operation of the device, there are 2 labels on the back of the device marked with power limit and fuse type. Please use power and fuse according the the label specification.

The label on the left provides the power requirement for the device, see below picture:



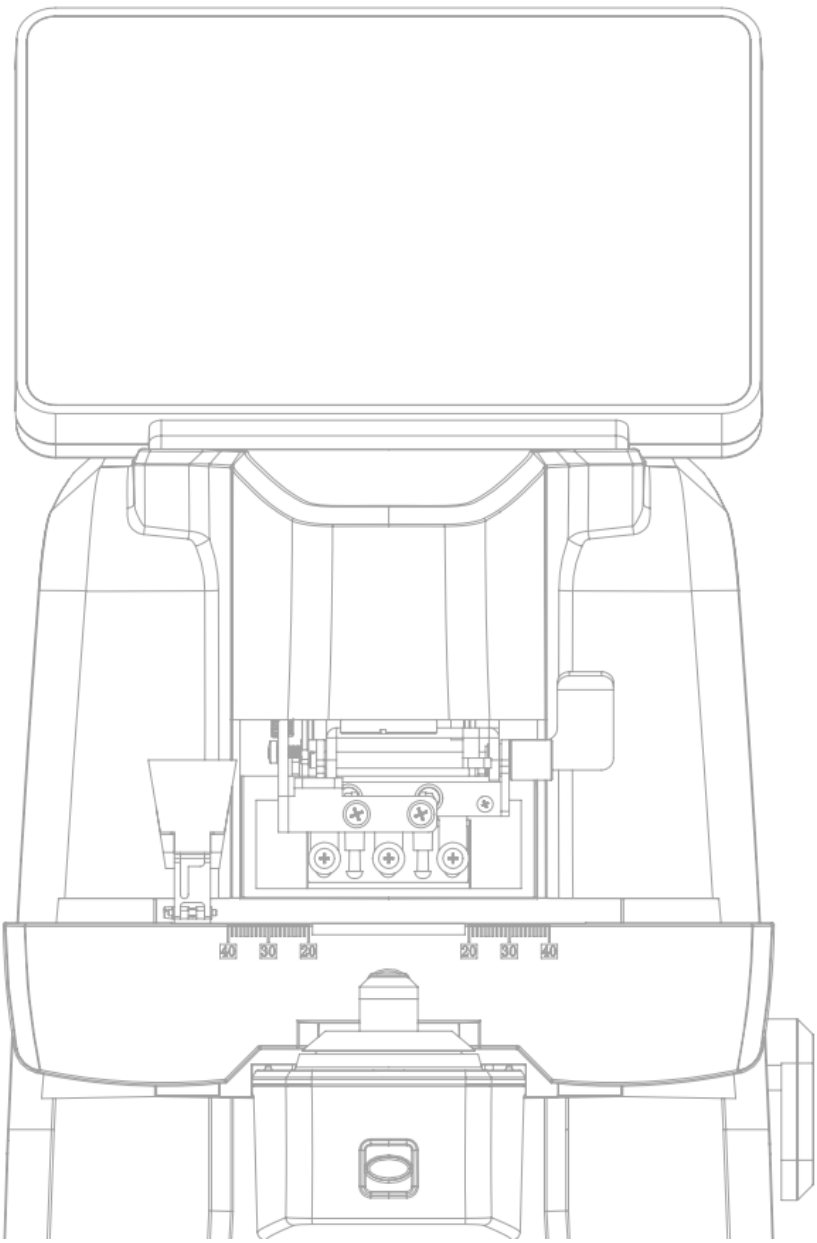
(picture 1 product label)

- When returning the device back to factory for repair or maintenance, please use clean cloth dipped with alcohol to disinfect the device. When the measurement result and the nominal value has big deviation, please contact our company or your dealer to check if the device needs calibration.

2.11 Marks on the device

Sign	Description
	Read the content in the user manual before use
	Power switch is closed
	Power switch is disconnected

3. Main Technical Specifications



3.1 Measure range

NO.	Measurement item	Range
1	Sphere	-25.00D to+25.00D
2	Cylinder	0D to ±10D
3	Cylinder axis	0° to180°
4	ADD	0D to +10D
5	Prism measure range	0△ to 20△
6	Measurable lens size	10mm to 90mm
7	Axis precision	±5°
8	PD	42mm to 82mm
9	PH	8mm to 45mm
10	Reference measurement	UV transmittance
11	Vertex diopter	525nm
12	UV-A wavelength	365nm

3.2 Device Spec

NO.	Item	Spec
1	Display	1024X600 TFT touch screen
2	Measurement data record	Built in 57mm thermal printer (30mmφ)
3	Interface	RS232、WIFI
4	Power input	110V~240V AC, 50/60Hz
5	Rated power	35VA
6	Size	203mm(L)X233mm(W)X471mm(H)
7	Weight	4.5Kg

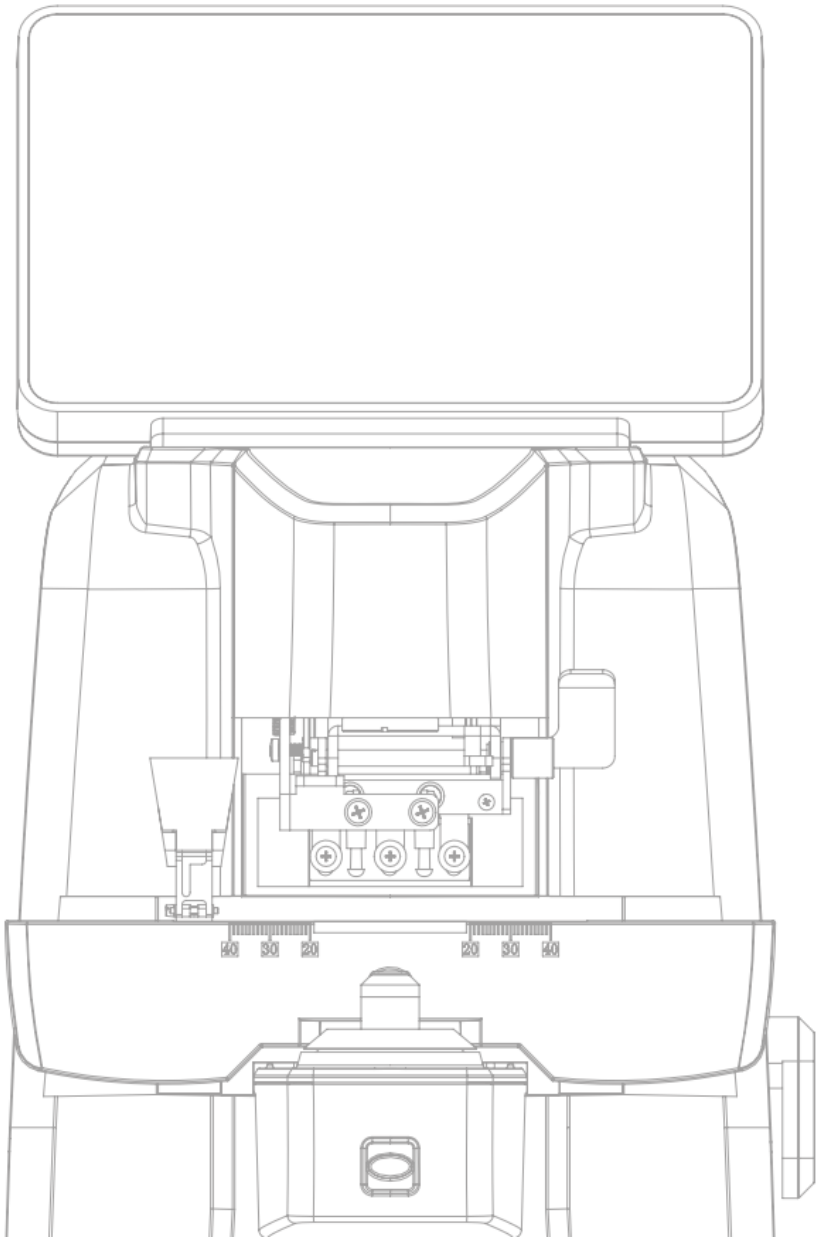
3.3 Work condition

NO.	Item	Spec
1	Temperature	10℃ to +35℃
2	Humidity	Relative humidity below 85%
3	Pressure	500hPA~1060hPA

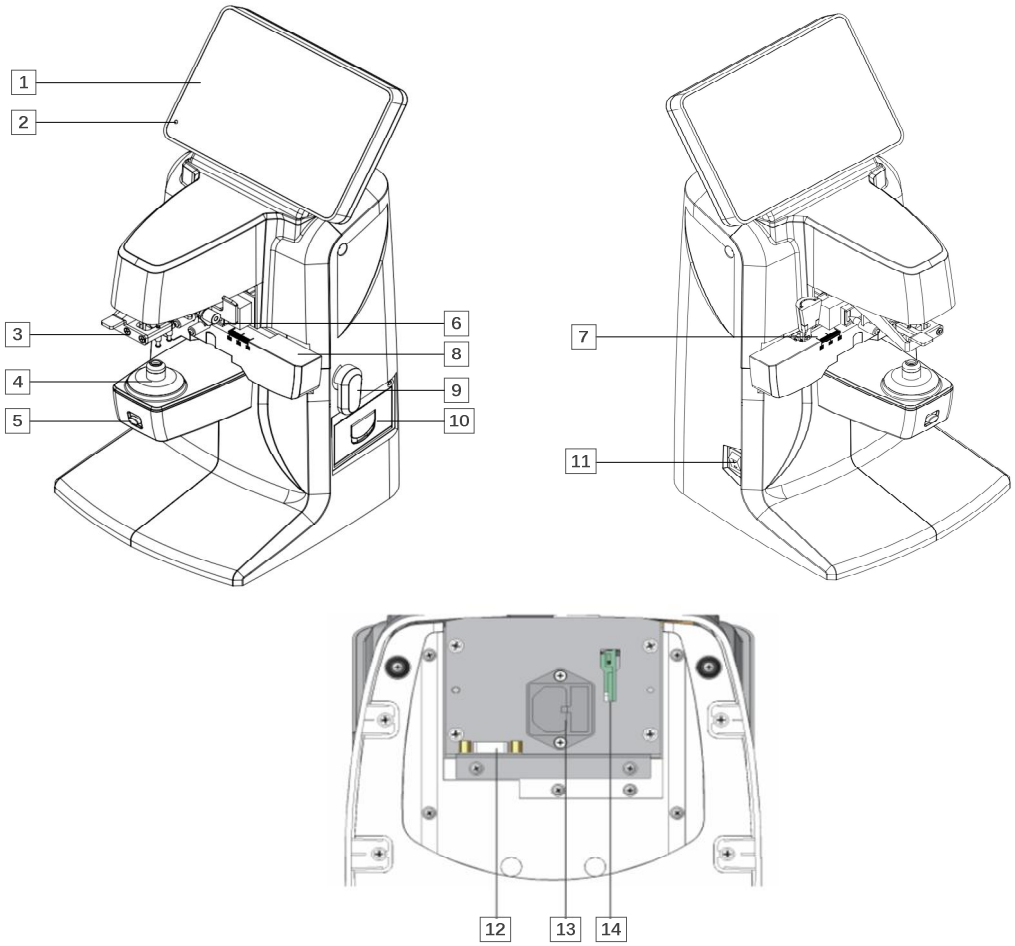
3.3 Storage condition

NO.	Item	Spec
1	Temperature	-10℃ to +55℃
2	Humidity	Relative humidity below 90%
3	Pressure	700hPA~1060hPA

4. Device presentation



4.1 Device structure



(Pic 2. device presentation)

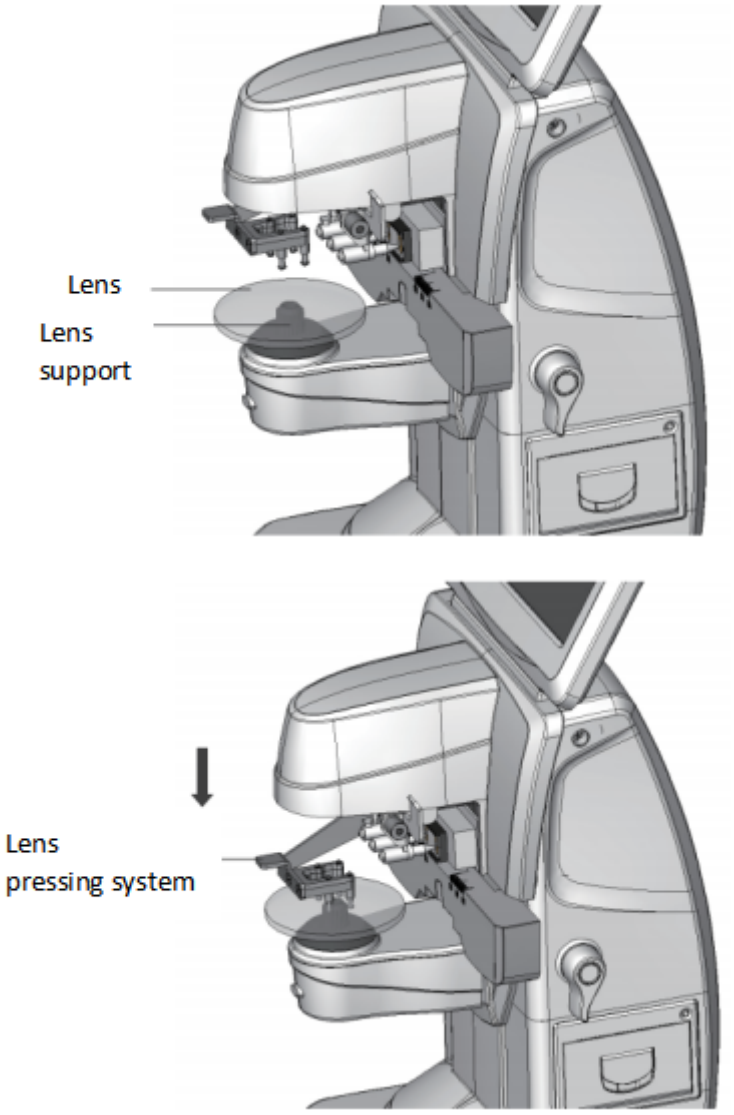
NO	Description
1	Touch screen
2	Power indicator
3	Lens pressing system
4	Lens support
5	Measure button
6	Marking system
7	PD measurement system
8	Lens table
9	PD handle
10	Printer
11	Power switch
12	Interface (RS232)
13	Power socket
14	TF card slot

4.2 Loading a lens

To ensure accurate measurement, please wipe off the dust and grease on the optical system and glasses of the device before loading a lens. When placing the lens onto the lens support, press the concave side on the lens support.

- Uncut lens

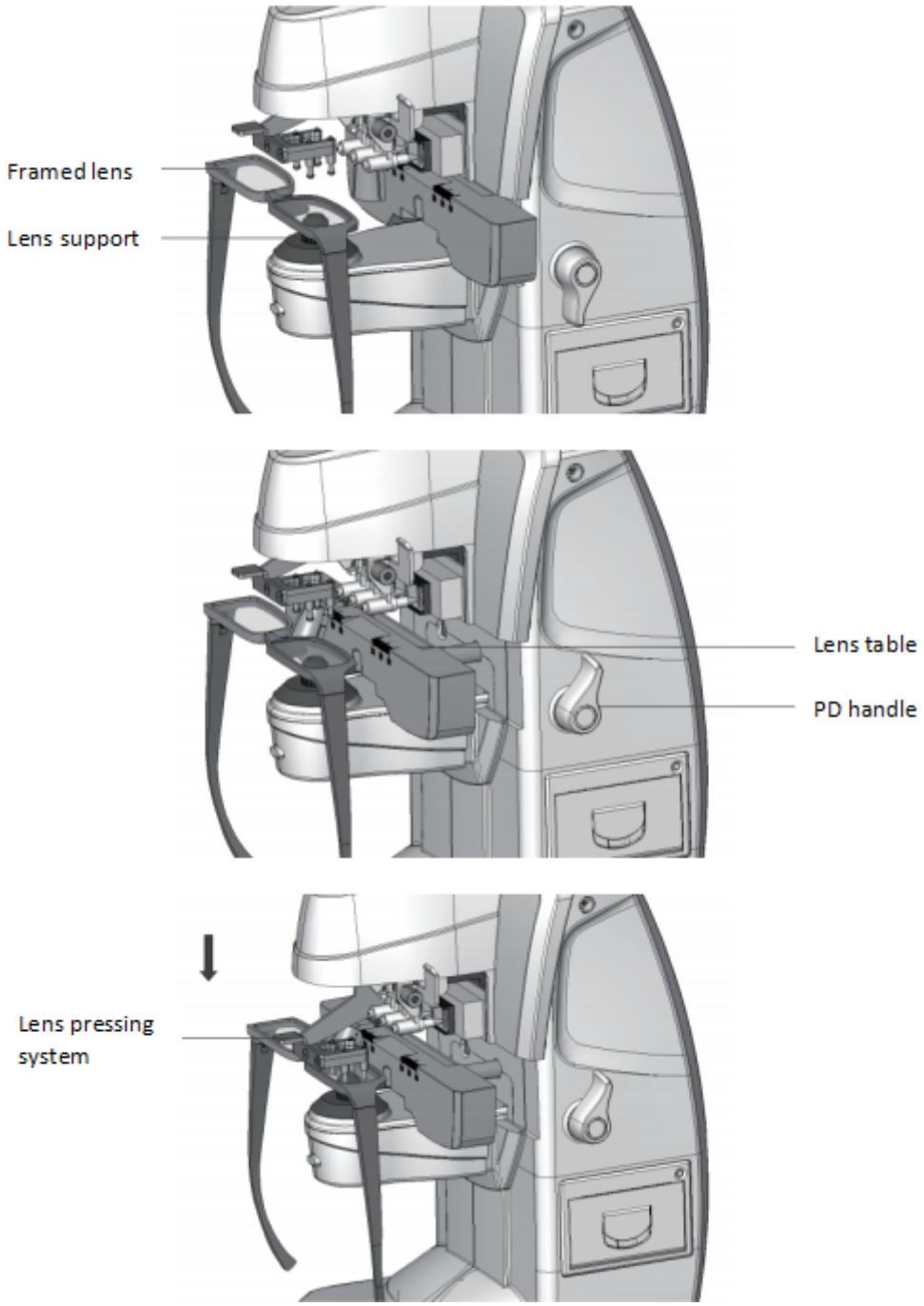
Place the uncut lens center on the lens support, convex side facing up as shown in picture 3 below. Then lower the lens holder to fix the lens as shown in picture 3 below.



(Pic 3 Loading a uncut lens)

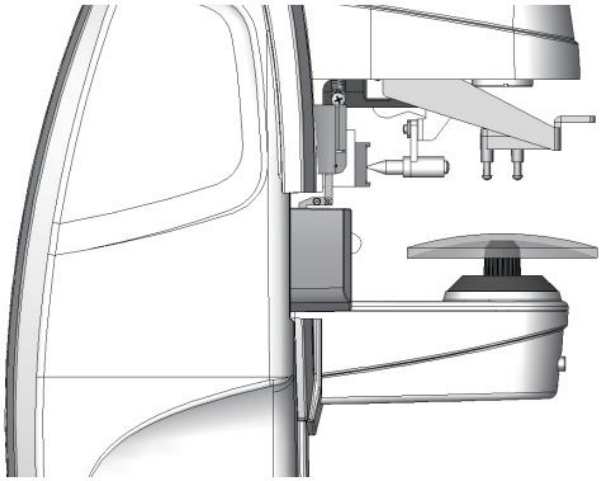
- Framed lens

Place one side of the glasses (left or right) lens center onto the lens support, use the handle to move out the lens table until it touches the lens frame as shown in picture 4.Then lower then lens holder to fix the lens as shown in picture 4.



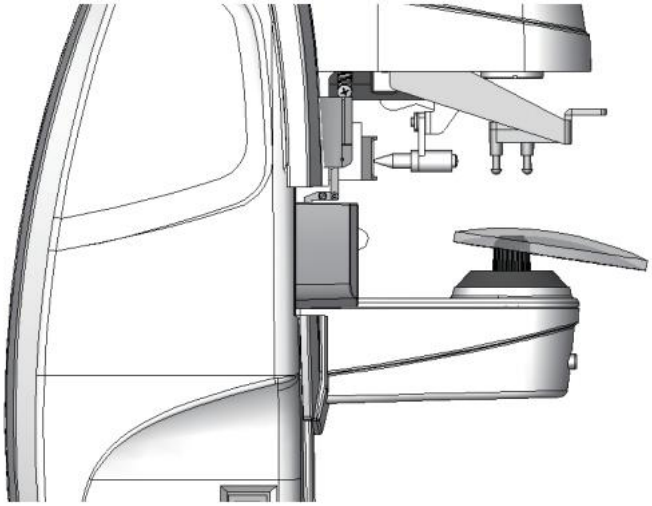
(Pic 4 Loading a framed lens)

- Bi-focal lens- Far vision



(Pic 5 Bi-focal lens- Far vision)

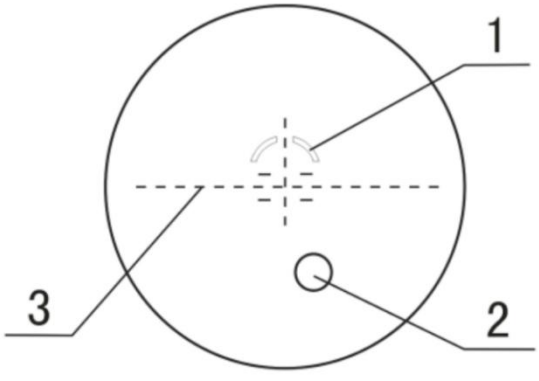
- Bi-focal lens-Near vision



(Pic 6 Bi-focal lens-Near vision)

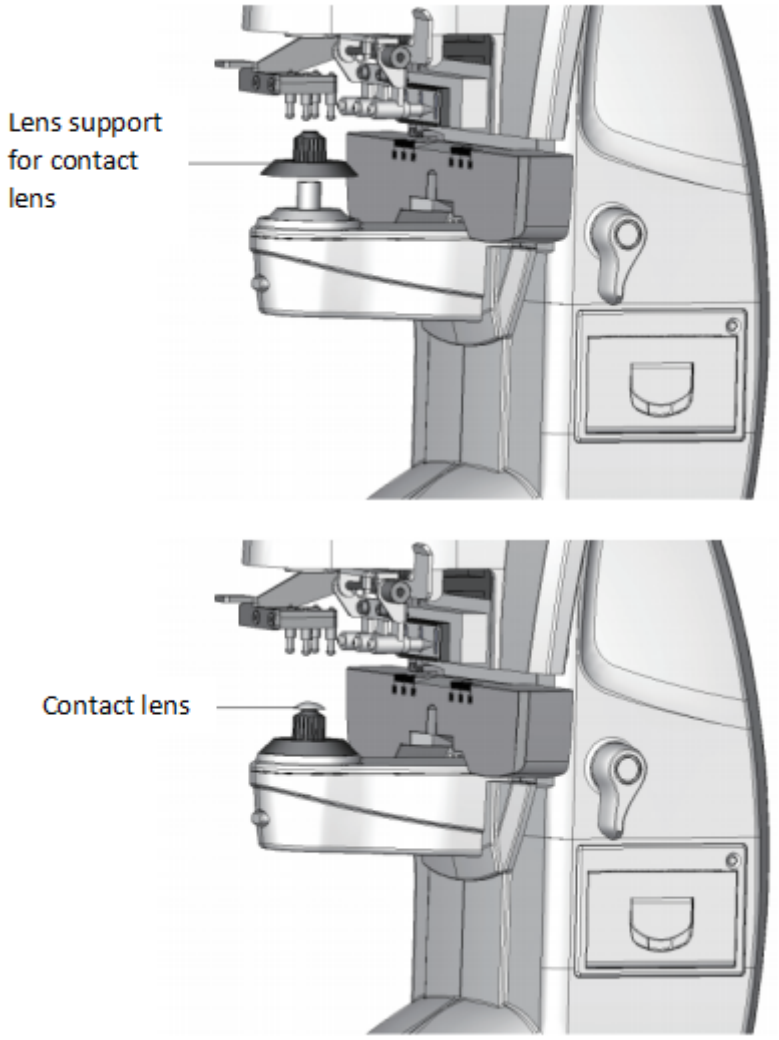
- Multi-focal progressive lens

Please load the multi-focal progressive lens the same way for loading bi-focal lens. But for the multi-focal progress lens we recommend to place the near vision area at the bottom (zone 1 in below picture) and far vision area at the top (zone 2 in below picture)



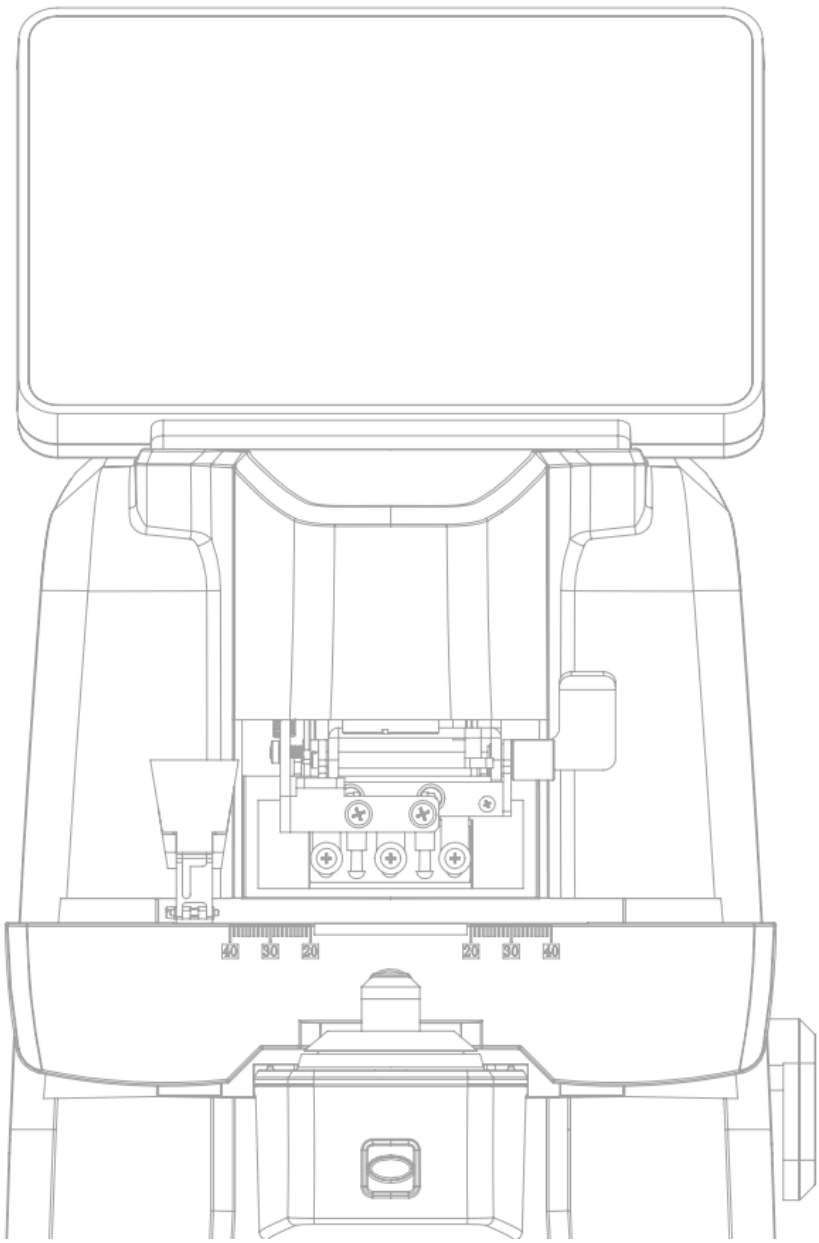
(Pic 7 Progressive lens)

- Contact lens



(Pic 8 Loading a contact lens)

5. User interface

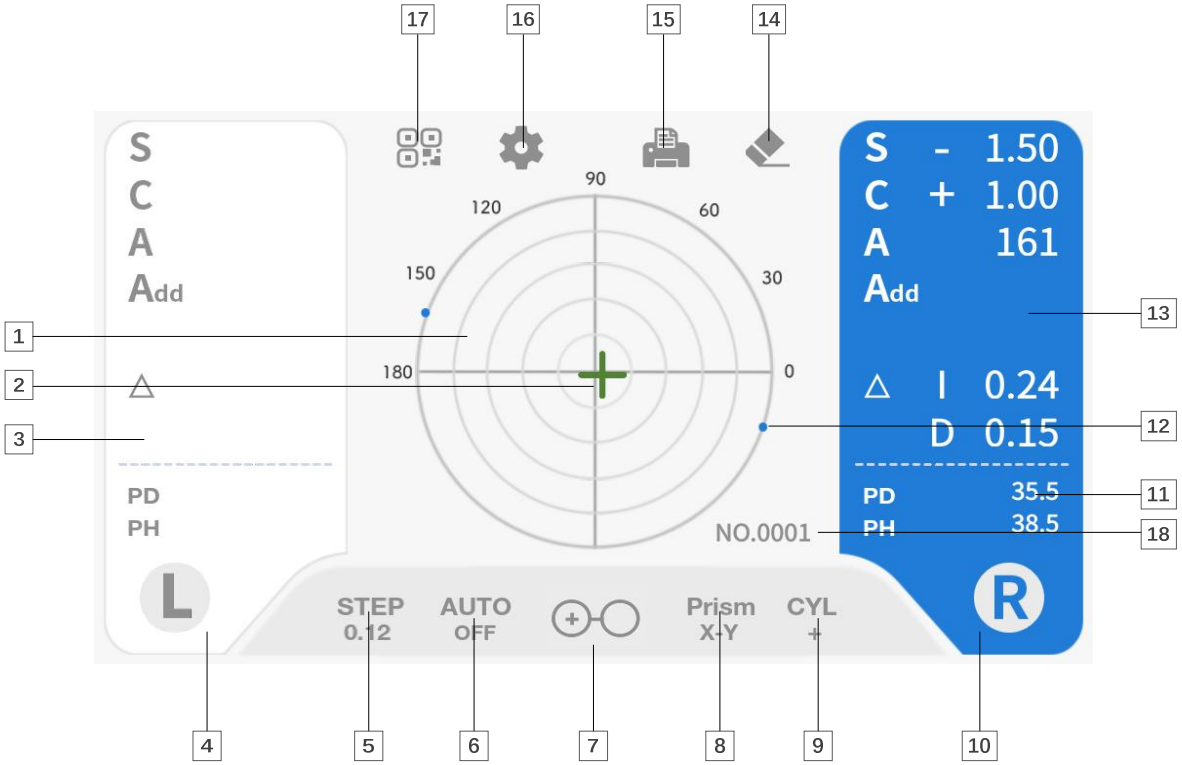


5.1 General

There are 4 types of measurement interfaces: auto, standard, progressive and contact lens. All measurement interfaces can switch between left and right eye (framed lens) mode or uncut lens mode.

5.1.1 Standard measurement interface

The standard measurement interface is as shown in picture 8 below, in this interface user can measure single or multi focal lens.



(Pic 9 measurement interface)

Below is the introduction of the function of each button in the standard measurement interface:

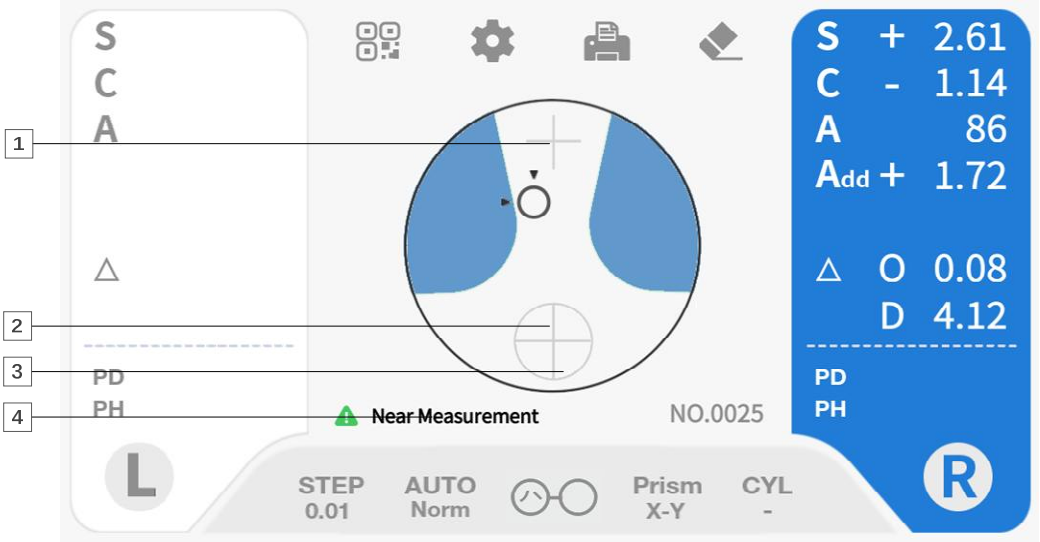
NO	Description
1	Marker for lens center: area for lens center. When measuring single focal lens, the center of the lens should be located in the area of the marker. If the lens has cylinder power, the marker can also vaguely indicates cylinder axis. When the lens has prism power, the marker can also vaguely indicates prism power(when lens prism is below 3 Δ)
2	Marker for lens optical center: to indicate lens optical center. The marker will change from a circle to a large cross when the optical center is aligned during the measurement process and finally color change from green to blue. Optical center not close: ○ ; Close to marker: + (green) ; Optical center is aligned: + (blue)
3	Left eye measurement data display area: showing basic data such as sphere, cylinder, and cylinder axis, with prism and ADD display optional.
4	Status indicator and switch button: showing current measurement for left/right eye.
5	Step button: press to switch the step between 0.01, 0.06, 0.12 and 0.25. This setting will influence the precision of the sphere, cylinder, ADD and equivalent cylinder. Prism and axis

<table>
<tr><td></td><td>angle increment will always at 0.01 Δ and 1° step.</td></tr>
<tr><td>6</td><td>Auto reading button: Press this button to choose auto or manual reading mode
<table>
<tr><td>
</td><td>Auto reading. When the lens optical center is aligned, the cross sign becomes blue the unit will automatically read the results</td></tr>
<tr><td>
</td><td>Auto reading. Under this mode, when optical center of the lens is near the center, and the sign becomes green the unit will start automatically read the results.</td></tr>
<tr><td>
</td><td>Manual reading. When the sign on the screen shown as suitable for measurement, press the measure button manually to measure.</td></tr>
</table></td></tr>
<tr><td>7</td><td>Measure interface switch button: There are auto measure mode, standard measure mode, progressive lens measure mode and contact lens measure mode, transmittance rate measurement mode and simulated PD-PH measurement. The button for each mode is shown in below table. The change of measure mode button will cause optical center display area and lens parameter display area change.
<table>
<tr><td></td><td>Auto measure mode. Under this mode, the unit will automatically detect the lens as normal lens or progressive lens then enter to the corresponding mode and start measurement. If it is focused on the near vision zone or far vision zone of the progressive lens, it will not be detected as progressive lens</td></tr>
<tr><td></td><td>Standard measure mode, can measure single vision lens or muti-focal lens.</td></tr>
<tr><td></td><td>Progressive lens measure mode</td></tr>
<tr><td>
</td><td>Contact lens measure mode</td></tr>
</table></td></tr>
<tr><td>8</td><td>Prism switch button: to change prism display mode. It’s optional for prism display, no display, P-B or BASE/I/O/U/D(or X-Y) as shown in table below
<table>
<tr><td>
</td><td>Prism display is off</td></tr>
<tr><td>
</td><td>Prism display in P-B mode in form of P-R polar.
The polar angle stands for the prism base orientation.
The polar diameter length stands for prism extreme value.</td></tr>
<tr><td>
</td><td>Prism display in BASE I/O U/D mode. It is another form of cartesian coordinate system.</td></tr>
</table></td></tr>
<tr><td>9</td><td>Cylinder signs: for cylinder value display includes:+/-,+ and -</td></tr>
</table>

	<table><tr><td>C +/−</td><td>Based on the cylinder measure result, the value can be displayed in positive value or negative value.</td></tr><tr><td>C +</td><td>The cylinder result can only displayed in positive value. The unit will calculate the result to show it in positive value.</td></tr><tr><td>C −</td><td>The cylinder result can only be displayed in negative value. The unit will calculate the result to show it in negative value.</td></tr></table>
10	Status indicator and switch button: showing current measurement for left/right eye.
11	PD-PH button: press to show or not show the PD and PH
12	Optical cylinder axis： if the lens has cylinder power, the red dot (symmetrical around the center of the circle) will mark the cylinder axis on the scale.
13	Manual ADD button: press ADD check button in the menu, choose manual, then this Manual ADD button will be activated. Under standard measure mode, bi-focal mode or multi-focal mode, after measure and save far vision zone data, move to the near vision zone or middle area of the lens and press this button, ADD will be shown on the screen.
14	Clear button: press this button to clear the memorized/read data.
15	Print button: export the saved (read) data. If the measurement data is not saved(read), this button will not work.
16	Setting button: press to switch to setting menu
17	QR code: after the measurement is finished and result is saved, press this button, a QR code will be generated and shown in the center of the screen. Use a scan device to scan the code and get the result on the device.
18	Measurement counter: after the measurement result is saved and locked, press clear button, the counter number will add 1.

5.1.2 Progressive lens measure interface

The factors in the progressive lens measure interface is almost the same, except for the lens display area in the middle of the screen as shown in picture 10 below:

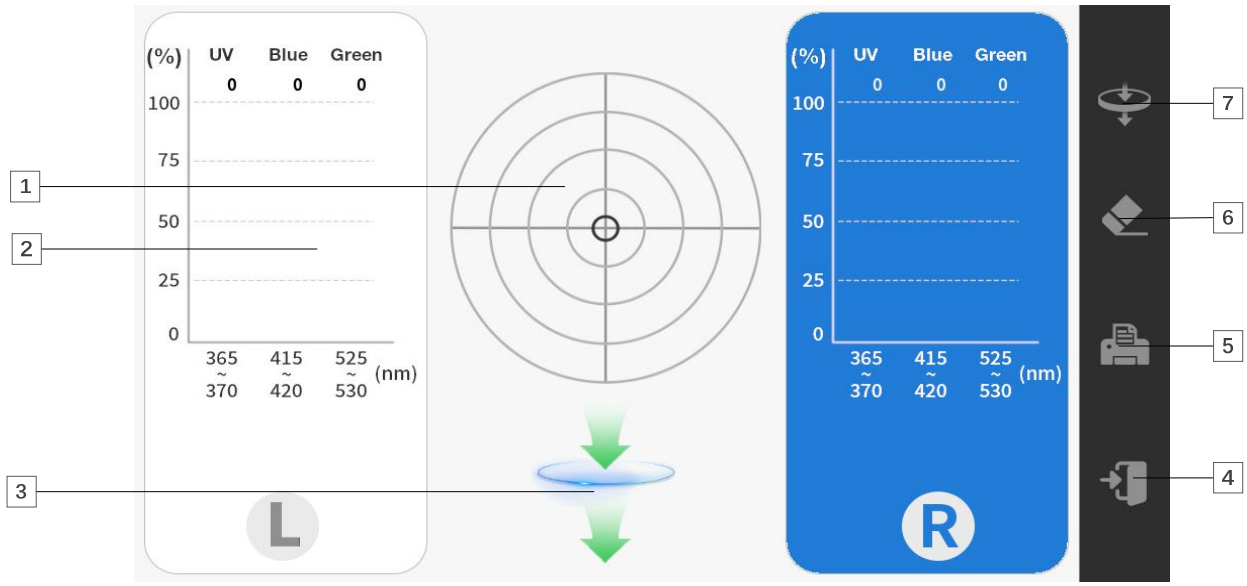


(Pic 10 progressive lens measurement interface)

NO	Description
1	Near vision zone: the cross is the near vision zone center, when measuring progressive lens near vision, move the lens near vision center to this cross mark.
2	Progressive lens optical center: Showing the optical center of the progressive lens. The arrows around will guide the direction to move the lens to reach far/near vision center.
3	Far vision zone:The cross is the far vision center. When measuring far vision zone, move the center to this area
4	Status indicator:To indicate current measuring status.

5.1.3 Transmittance rate measure interface

Following is the transmittance rate measurement interface:



(Pic 11 Transmittance rate measurement interface)

NO	Description
1	Optical center indicator:To show the lens optical center and vaguely show the lens prism
2	Result area:To show the measured lens green light and UV transmittance in percentage and charts.
3	Measure button and measurement status
4	Return button: press to exit transmittance rate measurement screen and go back to main screen.
5	Print button: press to print the measure result.
6	Clear/rectify button:When there is no lens on the lens support, press this button it will do transmittance rectify.
7	Display mode switch: press this button to switch between transmittance rate or reflection rate.

5.1.4 Contact lens measurement interface

Following is the contact lens measurement interface:

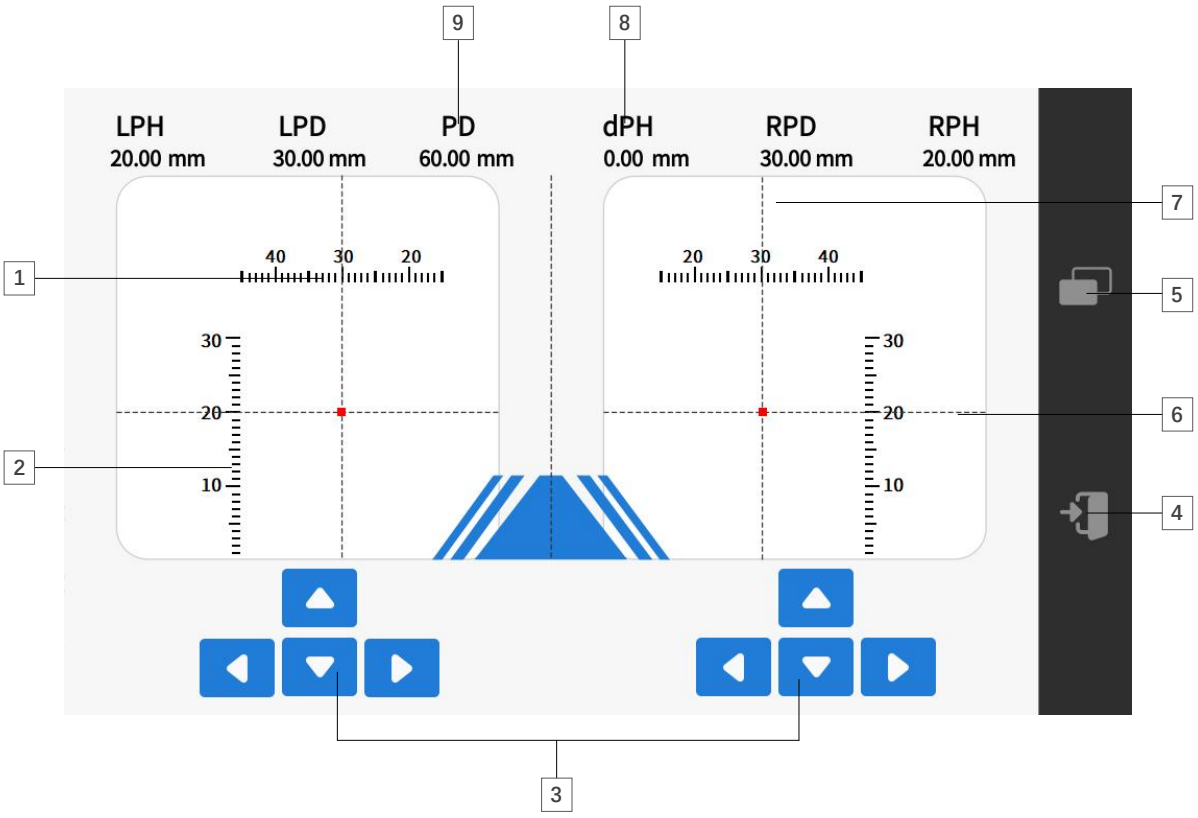


(Pic 12 Contact lens measurement interface)

NO.	Description
1	Sphere equivalent value: this value is only for contact lens measurement. Compared to sphere value, this value will more precisely show the contact lens actual power.

5.1.5 PD PH measurement interface

Following is the PD PH measurement interface:



(Pic 13 PD PH measurement interface)

NO	Description

1	PD ruler
2	PH ruler
3	PD-PH reference line movement button: press to move the left/right eye PD-PH reference line up/down/left/right.
4	Return button: press to return to main screen
5	Color reverse button
6	PH ruler (horizontal reference line)
7	PD ruler (vertical reference line)
8	Measurement result: showing LPH(left eye PH), RPH (right eye PH), dPF (absolute difference between left and right eye PH)
9	Measurement result: showing LPD(left eye PD), RPD(right eye PD) and PD.

5.2 Setting screens

Press the settings button in the measurement interface to go into settings screen as shown in picture below:



(Pic 14 Settings screen)

User can configure the lensmeter by the buttons on the settings screen:

NO.	Description
1	Setting options: press to change to different settings screen. When enter the settings screen it will show the parameter settings menu
2	Parameter list: showing configurable parameters
3	Setting options: choose the different options for parameter configuration. When selected, the option will become blue. Besides, in the input screen press the information display area will call out the virtual keyboard for input digits.
4	Next page: press this button to go to the next page (if there is)
5	Save&exit: press to save the modifications and go back to the measurement screen

5.3 Information input

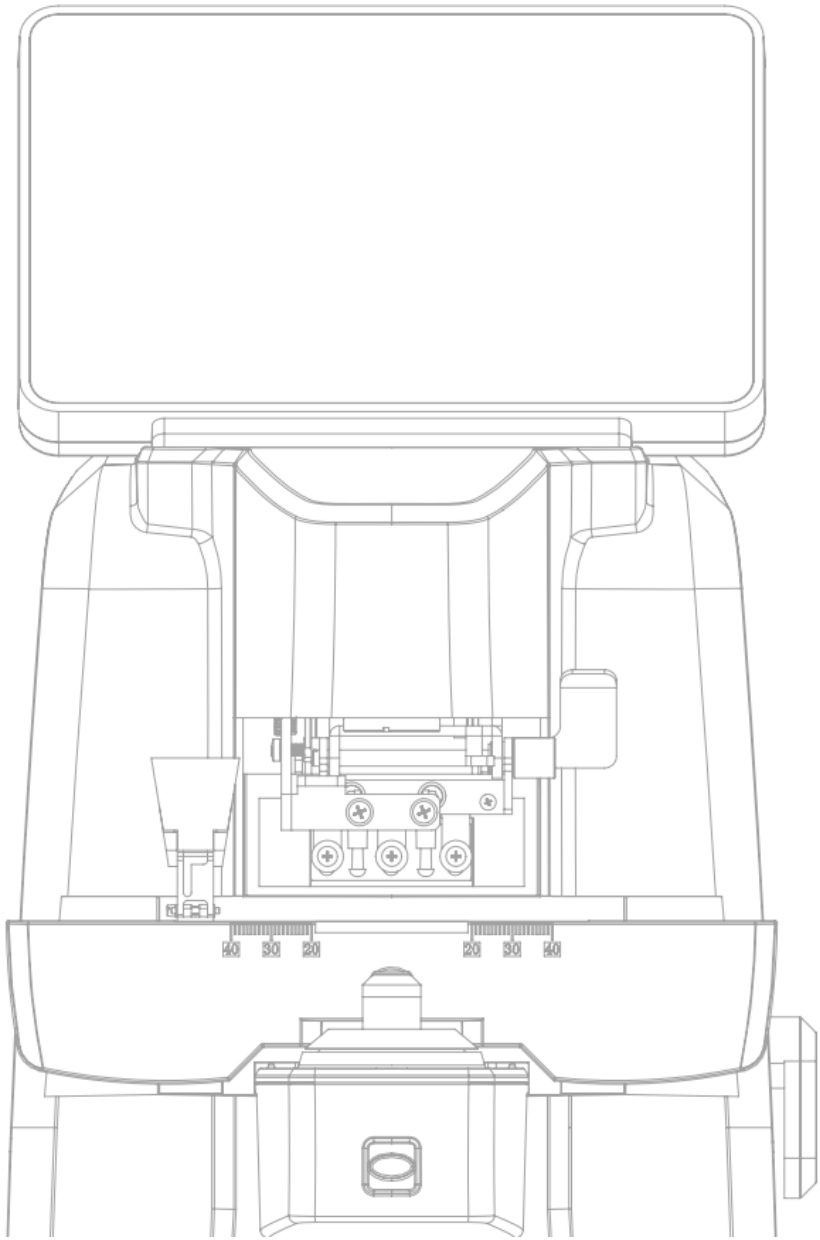
To input information to the device such as time, user information IP address and user ID. The interface is as shown in below picture:



(Pic 15 Information input screen)

NO	Description
1	Input info display area
2	Alphabet keyboard
3	Capital and small letter shift
4	Signs
5	Chinese-English input switch
6	Cancel the input and go back to previous page
7	Confirm
8	Delete
9	Number keyboard

6. Using the device



6.1 Before measurement

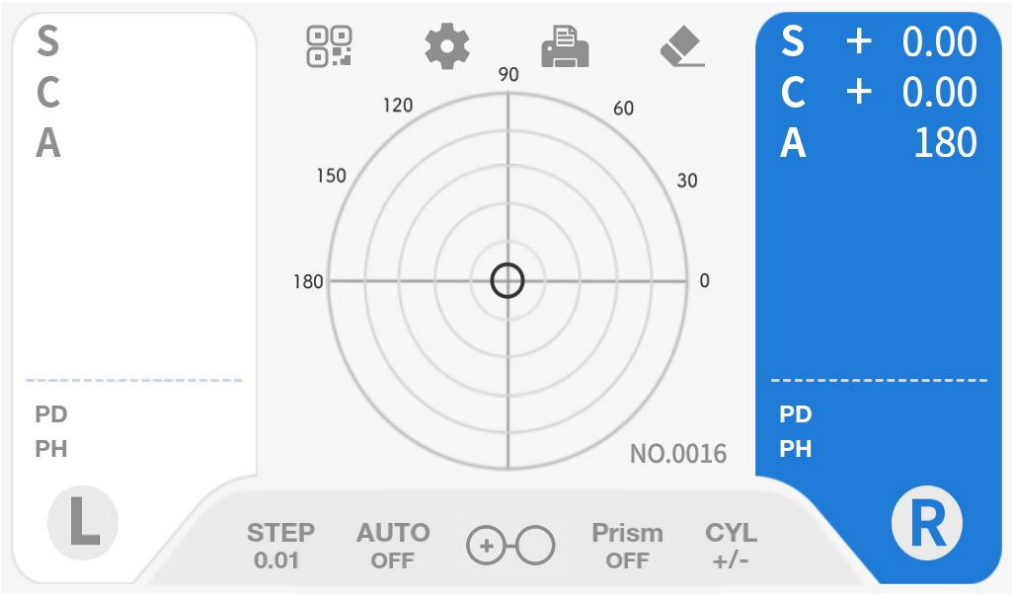
Make sure the switch on the left side of the device is at off position("O" side is pressed down), then connect the power cable onto the socket at the bottom of the device.

Switch on the device("|" side is pressed down). In around 2 second the device will show the start-up image as shown in picture below.



(Pic 16 Start-up screen)

After initialization is finished (in around 6 seconds), the screen will come to measurement screen as shown in below picture 17.The measurement screen shown up after initialization can be set in measure menu.



(Pic 17 Measurement screen)

⚠ Caution	If lens is put on the lens support before device start-up, or there is too much dust on the optical path or other issues,there will be warning in red letters on the screen. The warning message will not show if the problem is solved (such as remove the lens or clean the dust). But some times it will require unit re-start up.

6.2 Single vision lens measurement

Choose a measurement mode

Choose single vision mode or framed lens mode. If choose framed lens mode, confirm current lens is right eye or left eye.

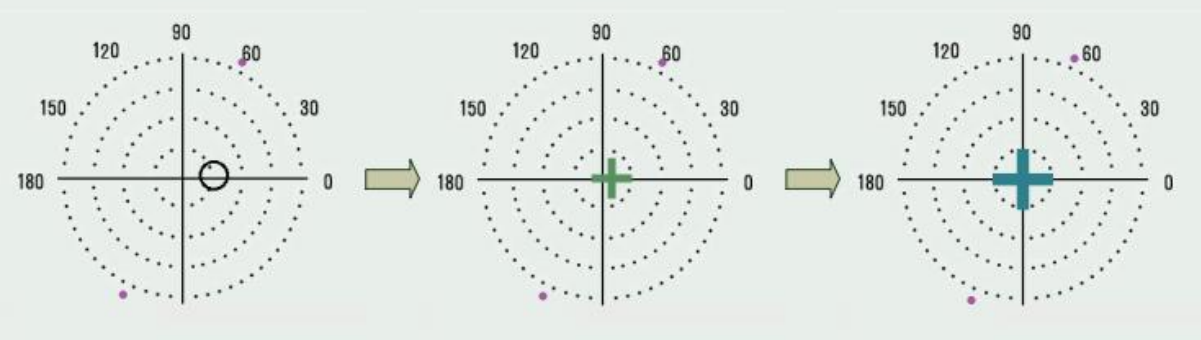
Choose measurement mode according to part 5.1.1 #7.

Choose auto or manual read mode according to part 5.1.1 #6.

Choose prism display mode according to part 5.1.1:OFF, P-B or BASEI/OU/D.

Place the lens on the lens support and move it to make the optical center match the indicator.

As shown in picture 18, move the lens make the round indicator ○ to be in the center.If the optical center of the lens is near the center, the indicator will change from ○ to ＋(green) . Keep moving the lens until it focus on the lens center on the green ＋ changes from green to blue and becomes bigger.



(Pic 18 move the lens to make the lens optical center is focused and aligned)

If choose manual reading, press the button under the lens support

If choose auto-reading, when the lens optical center is close (green ＋) or aligned (blue ＋), the unit will read and save the measured data automatically. And the measurement of the single vision lens is finished and the data display will change to Memorized (read)

If under framed lens mode, move to measure the other side

According the AUTO R/L in measure menu setting, when remove current lens, the measure interface will automatically switch to the other side. If AUTO R/L option is off, then user need to manually switch to the other side.

Change cylinder sign according to user demand

After measured data is saved, press cylinder sign button to change cylinder display according to table 6.

6.3 Multi-focal lens measurement

Multi-focal lens includes bi-focal lens and tri-focal lens. Bi-focal lens has far vision zone and near vision zone, while tri-focal lens has middle zone beside far and near vision zone. The sequence of measuring multi-focal lens is from far vision to near vision.

6.3.1 Bi-focal lens measurement

Choose measure mode in measure interface

See part 6.2

Place the far vision zone of the bi-focal lens onto the lens support.

Note, lens convex side facing up, near vision zone facing the unit and far vision zone facing the user.

Move the lens until the indicator changes from ○ to +(Green).

Far vision zone data read

There are 3 ways for reading far vision data: auto reading, ADD reading and manual reading.

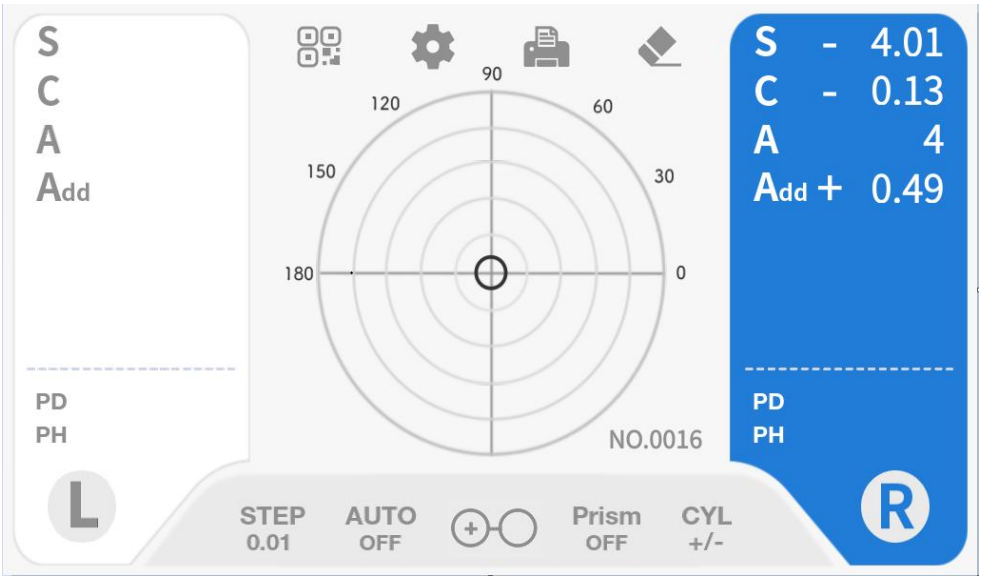
For auto reading, user need to set auto reading in measure menu, and set “AUTO memory”, and set auto memory as “near center”, AUTO ADD “ON”. After setting, when the indicator moves near the center the unit will start auto reading and the measured result will be shown as saved.

If use ADD button, in measure menu, choose “OFF” for auto ADD. After setting, when the optical center is near the center, press ADD button, the measure interface will be shown as in picture 19 below.

If choose manual reading, in measure menu, choose “ON” for auto ADD. When lens optical center is close to the center, press the reading button to save the measured result.

Near vision zone data read

Move the lens for focusing on near vision. If AUTO ADD is on, when the lens near vision zone ADD is detected, the unit will switch from data saved to working status and show ADD as in picture 19. Keep moving the lens until the ADD value is stable then press the measure button to save data.



(Pic 19 ADD display in measurement screen)

If in framed lens mode, now user can start measure the other side

See part 6.2

User can change cylinder sign according to their need

See part 6.2

6.3.2 Measure a Tri-focal lens

Choose measurement mode in the measurement screen

See part 6.3.1.

Place thetri-focal lens onto t he lens support

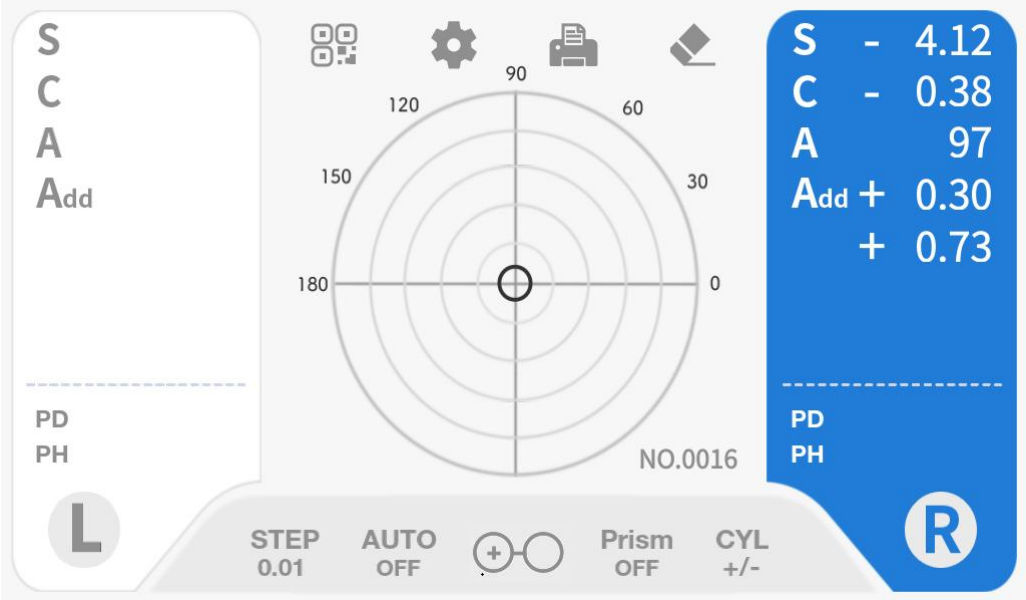
See part 6.3.1.

Read the far vision zone data

See part 6.3.1

Measure middle zone

Move the lens to focus on the middle area. If AUTO ADD is on, when middle area of the lens is detected, the data display area will automatically show the measured data and ADD value will also be displayed as shown in picture 20. Then press measure button to save the data. If auto ADD is off, then user need to press ADD button manually in the measure interface as shown in picture 20 below.



(Pic 20 ADD display on measurement screen)

Measure near vision zone

Move the lens for focusing on near vision until the ADD value is stable then press the measure button to save data.

If under framed lens mode, move to measure the other side.

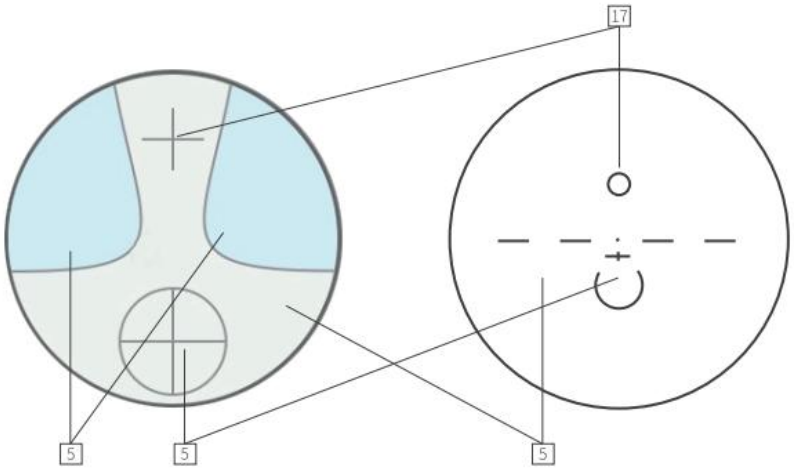
See part 6.2.

User can change cylinder sign according to their need

See part 6.2

6.4 Progressive lens measurement

Progressive lens is consist of 4 parts: 1 far vision zone, 2 near vision zone, 3 progressive zone and 4 aberration zone. When measuring a progressive lens, measure far vision first, then measure near vision. For the first time, it is recommended to focus on progressive zone on the lens support. Under auto measure mode, the unit will automatically recognize the lens only when the progressive zone is focused. Please measure the progressive lens under progressive lens mode. Please refer to the comparison of progressive lens display on the unit and the actual uncut lens zones in picture 21.



(Pic 21 Different zones on progressive lens)

6.4.1 Uncut progressive lens measurement

See part 6.4.1

6.4.2 Framed progressive lens measurement

Choose measurement mode in measurement screen.

See part 6.3.1.

Place the framed lens

Place the framed lens onto the lens meter as described in part 6.2. But make the unit focus on the progressive zone of the framed lens

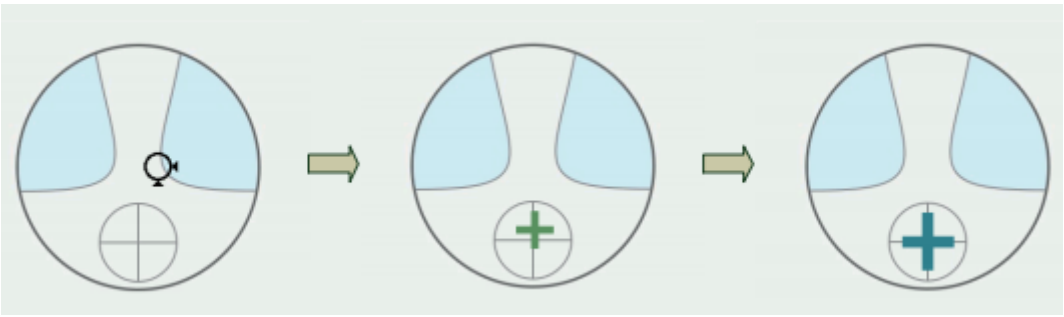
Measure far vision zone

Move the far visions zone to the middle until the ○sign change to +(green).

Keep moving until the ┼change to blue.

During lens movement, there will be a guiding sign as shown in below picture 22. Move the lens as the sign guided. If auto reading is chosen, then the far vision result will be automatically saved. If not choose auto reading, then press the save button to save the result.

After far vision zone measurement is finished, it will automatically switch to near vision measure mode.



(Pic 22 Move lens to make it focused on the far vision zone optical center)

Measure near vision zone

Under near vision mode, the ADD will be automatically displayed. As shown in below picture23, move the lens in the guided direction until the + sign change to blue.If auto reading is chosen, then the near vision result will be automatically saved. If not choose auto reading, then press the save button to save the result.

After finish near vision measurement, at the bottom of the screen will show finish notification.



(Pic 23 Move lens to make it focused on the near vision zone optical center)

If under framed lens mode, move to measure the other side.

See part 6.2.

User can change cylinder sign according to demand.

See part 6.2

⚠ Note	During measuring process, user can move the lens back and forth by pushing it with lens table. Therefore the lens frame must press against with the frame support.

6.5 Contact lens measurement

Choose measurement mode under measurement screen

See part 6.2.

Place the contact lens

See part 6.2.

Focus the contact lens

Use tweezers to move the edge of the contact lens to make the + sign change from green to blue.

Choose auto or manual reading to save the measure result.

Use tweezers to take away the lens from the lens support

If under framed lens mode, move the measure the other side.

See part 6.2

User can change cylinder sign according to the mode

See part 6.2.

6.6 Framed lens PD　PH measurement

6.6.1 Measure PD and PH while measure lens

Move out the lens table

Rotate the handle on the right side of the device to move out the lens frame table to suitable position (near the middle of the whole range)

Place framed lens

Place one side (left or right) of the lens center on the lens support, with the lens bottom side facing in and top of the lens facing user. Make sure the lens table is fixed to press against the lens support bottom and the noise piece is press against the nose of the glasses. Lower the lens holder.

Take a measurement r

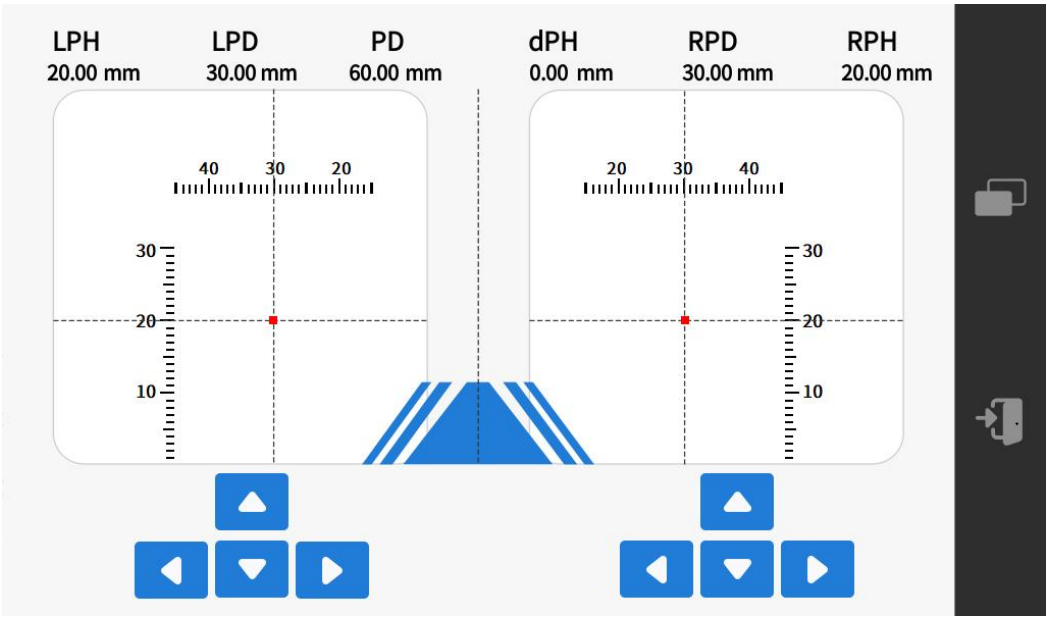
Keep the lens piece fixed during measurement. When near or focused on the center user can choose auto/ manual mode to save data. When the data is saved, the PD/PH reading will be saved too.

Measure the other side

Use the same method to measure lens of the other side.

6.6.2 PD PH measurement after lens marking

The virtual PD and PH measurement screen is as shown in picture 24 below:



(Pic 24 Virtual PD PH measurement screen)

Enter virtual PD PH measurement screen

In the measurement screen long press the PD-PH display button (as shown in part 5.1.1), in about 2 seconds will enter virtual PD PH measurement screen

Place the framed lens

Place the marked frame lens on the nose piece to make it align with the direction indicated by the nose piece reference marker as shown in picture 24. If there is some gap between the bottom edge and the actual initial position, press the button on the right side to adjust the PH ruler position (see part 5.1.5 virtual PD PH measurement screen button 1).

Use the button on the screen to adjust the level and vertical reference line position

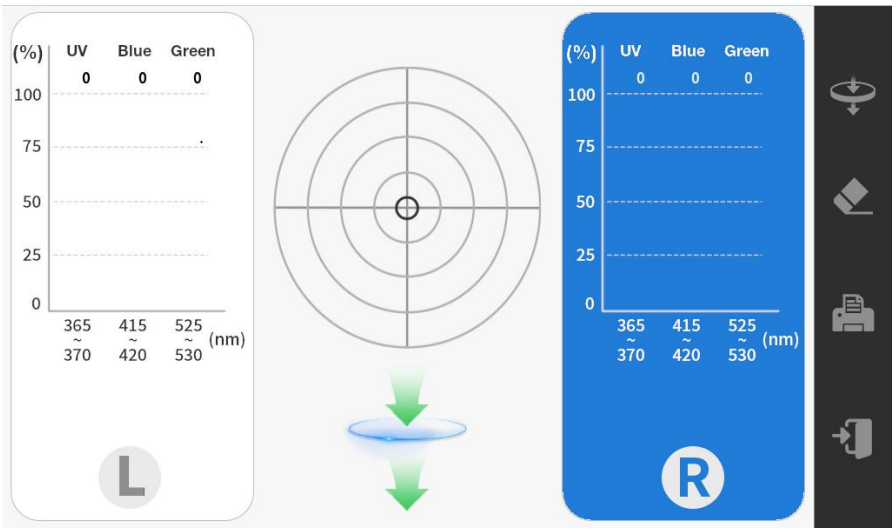
Adjust the reference line position to make the marked optical center of the lens align with the cross point of the level and vertical reference line.

Read or export the data

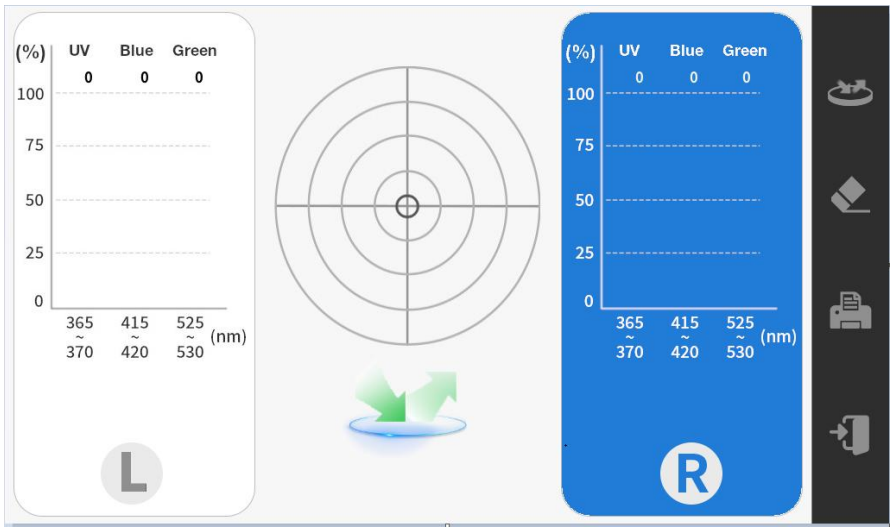
Read the value under LPD, RPD, PD and PH.

6.7 Lens transmittance rate measurement

There are 2 display modes for lens transmittance rate measurement, transmit rate mode (as shown in picture 25) and reflection rate mode (as shown in picture 26). These 2 modes can be switched by the mode switch button on the right side.



(Pic 25 Transmittance rate screen)



(Pic 26 Reflection rate mode)

Enter transmittance rate measure screen

Press the measurement switch button in the measurement screen to enter the transmittance rate measurement screen

Place the lens

Place the lens to be measured onto the lens support, move the lens in the direction guided by the marker to find the prism and lower the lens holder.

Lens transmittance rate measurement

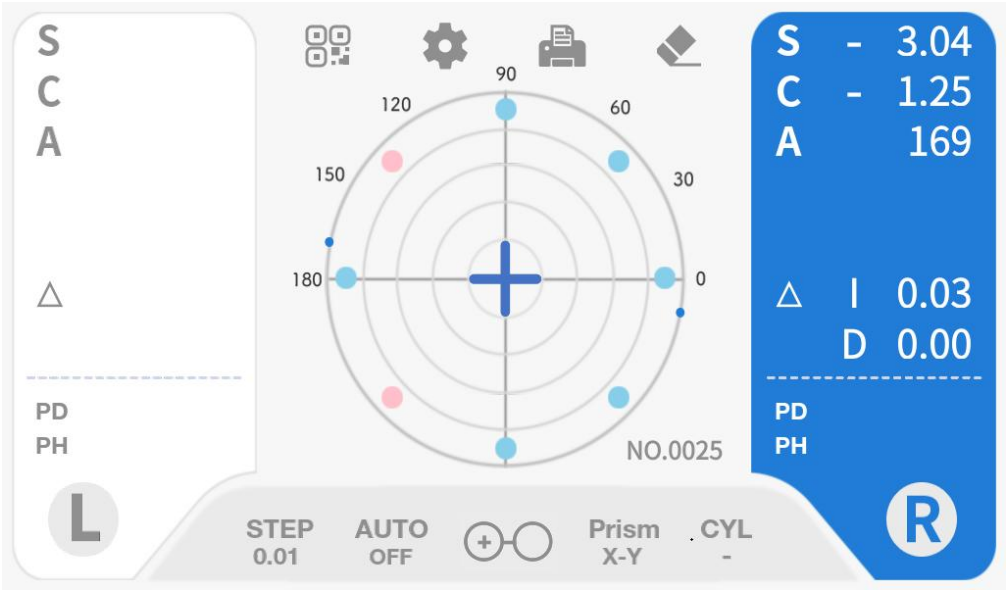
Press the measure button or  on the measurement screen to start the transmittance rate measurement.

⚠ Caution	Press clear button can reset the measurement mode. When the lens is placed on the lens support, press clear button can only reset display mode; when there is no lens on the lens support, press clear button can not only reset display mode, it will reset the initial value for transmittance measurement too. when entering UV screen the system will asthmatically reset. Please operate after the reset is finished. Or it will cause some error.

6.8 Lens twist check

Switch on the lens twist measurement function

In the settings menu- measurement settings② (6.11.1 measurement settings), set the twist measurement to be ON. The measurement screen with twist check is as shown in picture 27.



(Pic 27 Measurement screen with lens twist check)

Place the lens onto the lens support

Check the twist between the distribution of the 8 dots on the scale to the center vertex.

There are 5 types of dots: , each color stands different level of twist.  means there is no twist;  stands for the maximum twist. If the 8 dots distance to the center is different, then the 8 dots will be different colors; and if the 8 dots are with the same distance to the center, the dot color will be the same.

⚠ Caution	The measurement result is only for reference. twist check is not for progressive lens.If lens sphere lens power is above $\pm 10m^{-1}$, there might be some error in the measure result.

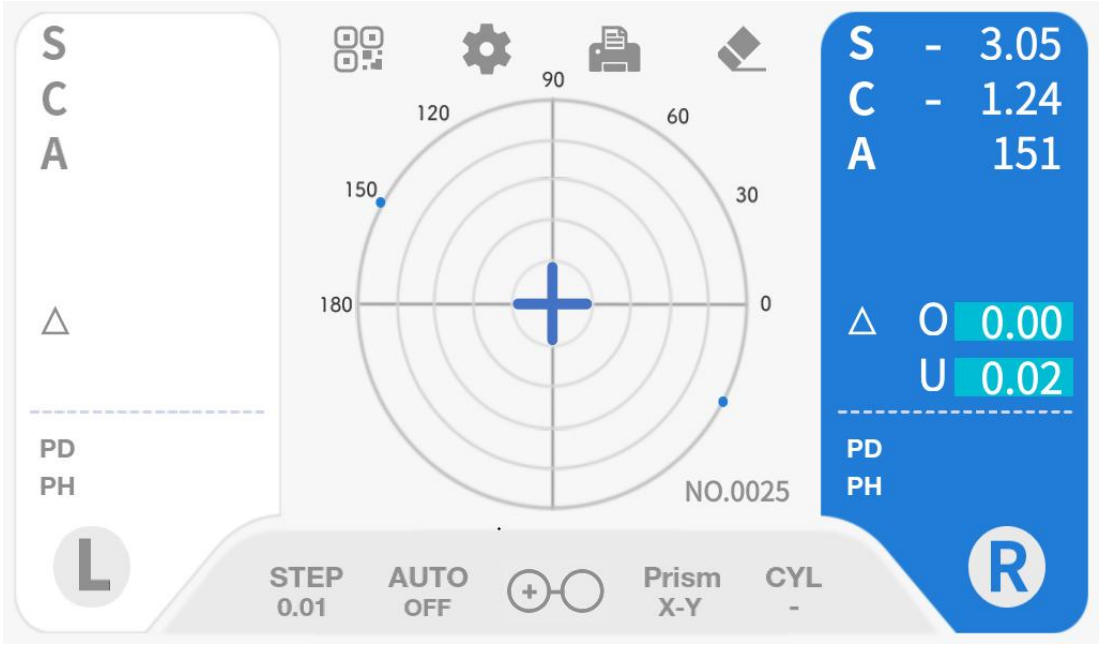
6.9 Prism

This function is to mark the prescription heterophoric lens.

Input the prism prescription beforehand, the marker will move in direction opposite to the prism direction. Move the lens to make the marker align with the optical center, then mark the lens.

The prism prescription mode can only be working when the prism prescription is switched on in the settings menu -measurement settings ① (part 6.11.1). The measurement screen with prism prescription

function is as shown in picture 28 below.

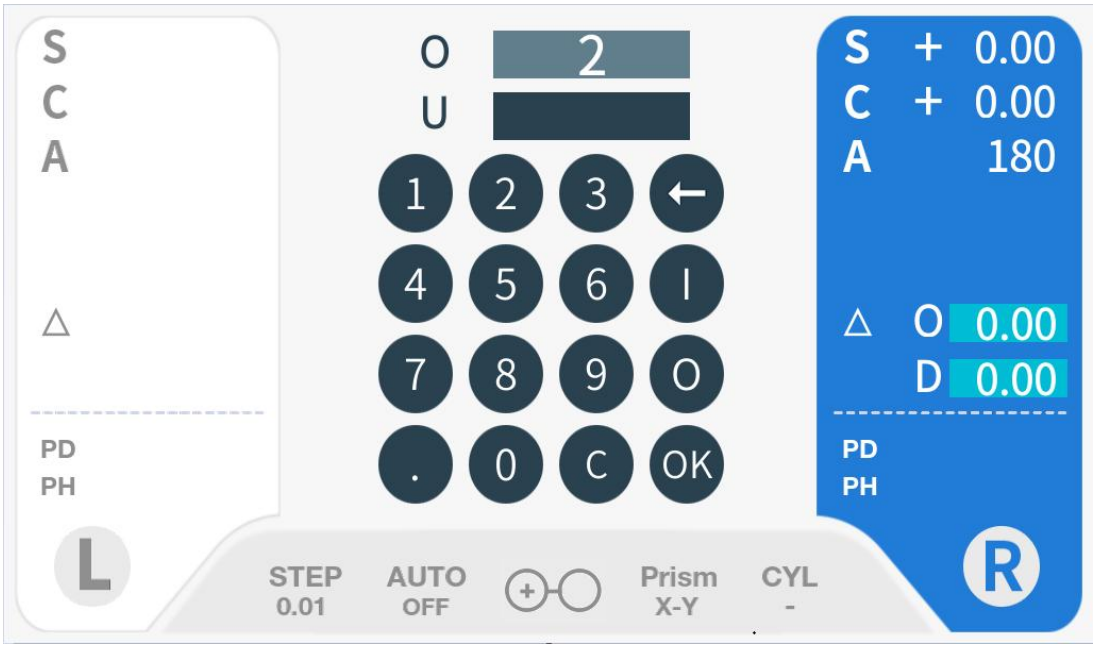


(Pic 28 Measurement screen with prism prescription)

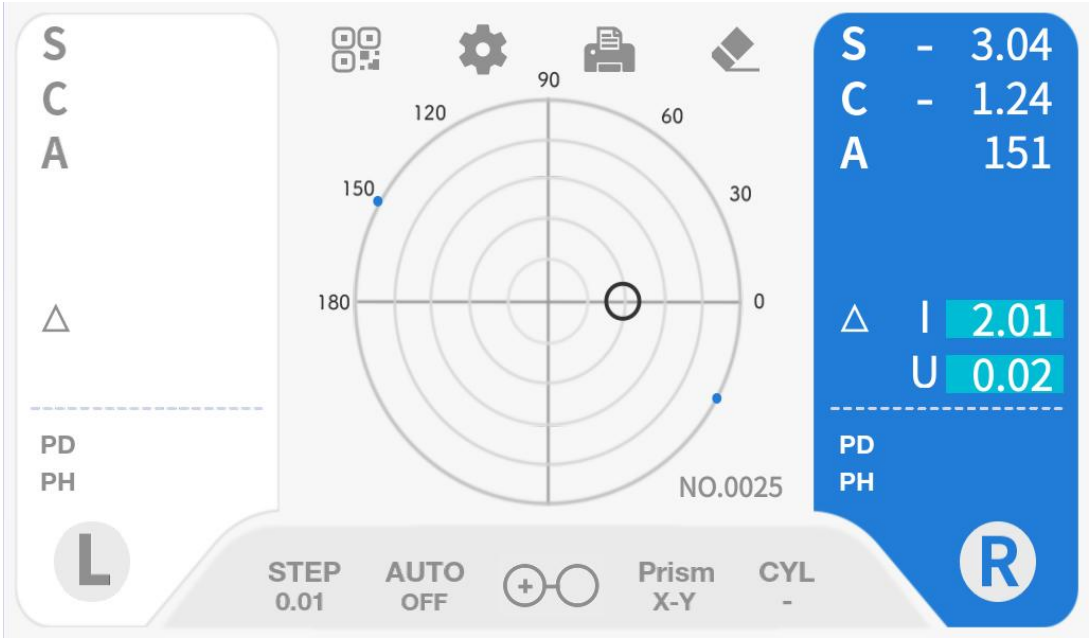
By pressing the highlighted part of the prism to start prism setting.

Input the prism prescription using the keyboard as shown in picture 29.

After input prism prescription, move the lens, when the lens aligned marker will be the input prism prescription.



(Pic 29 Prism prescription input)



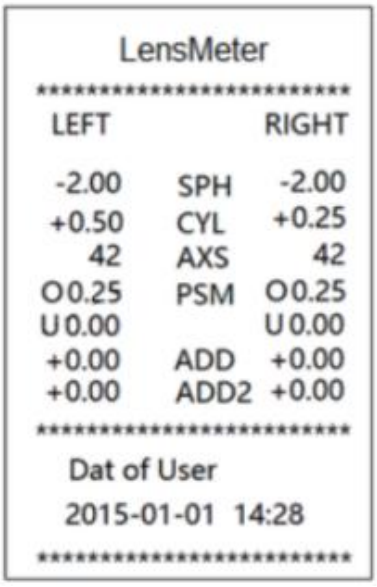
(Pic 30 Measurement screen after inputting prism prescription)

⚠ Caution	Under both rectangular coordinates or polar coordinates user can input prism prescription. The input absolute prism value limit is 20△.

6.10 Printing

After finishing a measurement, press the print button on the right side of the device to print the result. Below picture31 is the example of the printed tickets.

The info shown on the ticket can be configured in export setting menu, such as print time, user info, prism, PD-PH etc.



(Pic 31 Example of printed ticket)

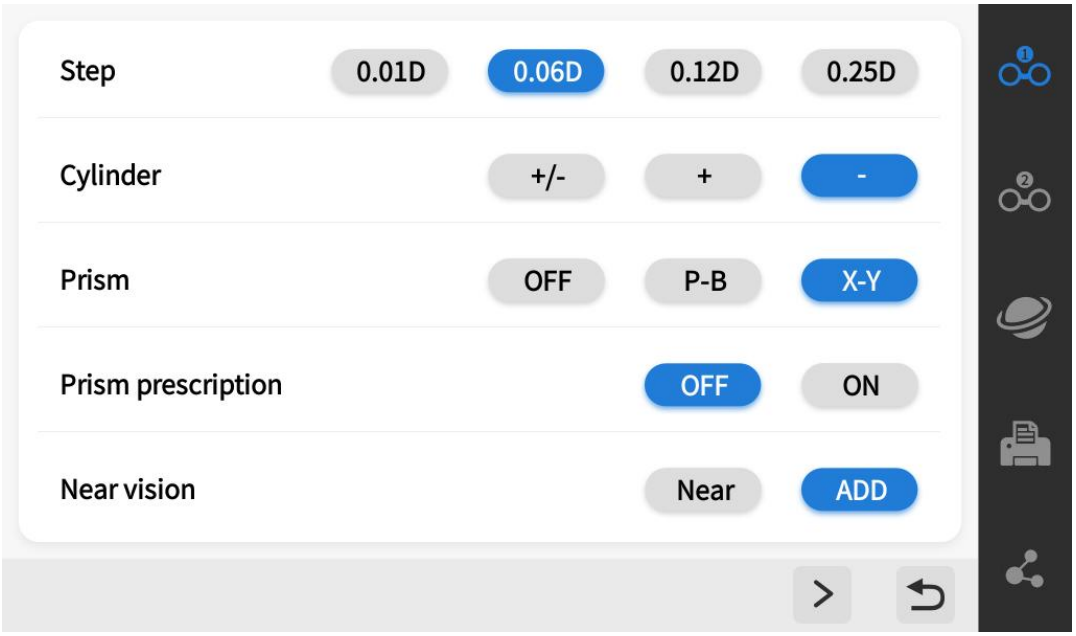
6.11 Settings and connection

6.11.1 Settings menu

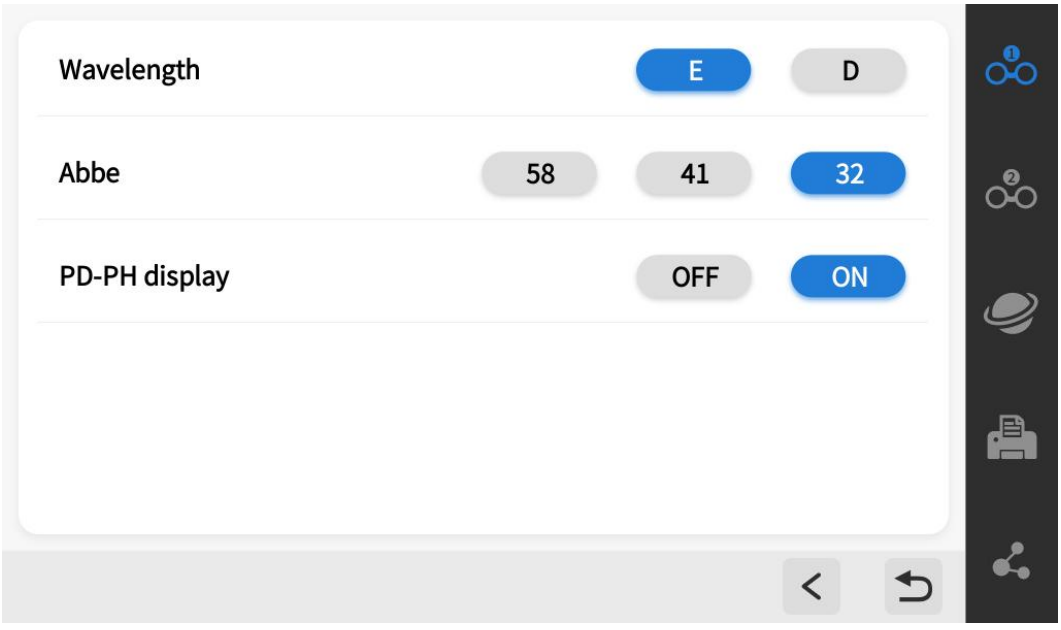
Press the button to enter settings menu to configure each of the parameters under the menu. After settings finished, press to save and exit.

Measurement settings ①

Measurement parameter configuration menu is as shown in picture 32 (page 1) and 32 (page 2).



(Pic 32 Measurement parameter ① settings page 1)



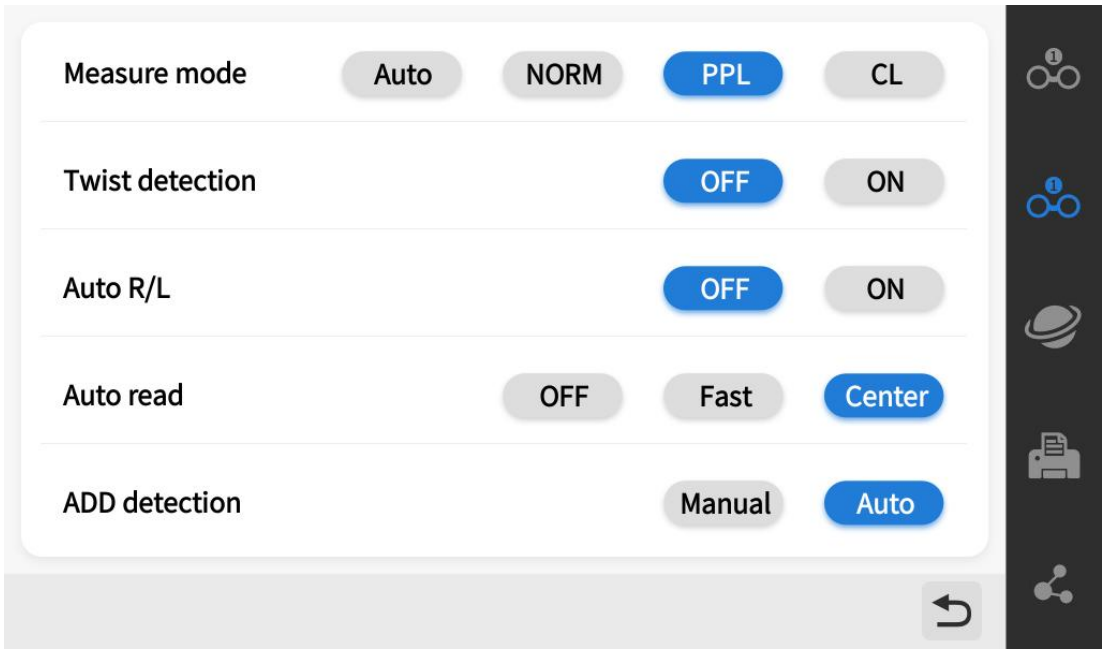
(Pic 33 Measurement parameter ② settings page2)

Parameters in Measurement settings menu ①

Parameter	Configuration	Description
Sphere and cylinder step	0.01,0.06,0.12,0.25	Measurement result precision/minimum resolution
Cylinder sign	+/,+,-	Choose cylinder mode
Prism	OFF, P-B, X-Y	Prism display mode
Prism step	0.01, 0.06, 0.12	Measurement result precision/minimum resolution
Near vision	NEAR ADD	ADD or SADD
Wavelength	E, D	
Abbe	58, 41, 32	
PD-PH display	ON, OFF	Display PD-PH value in measurement screen

Measurement settings ②

Measurement parameter configuration menu is as shown in picture 34



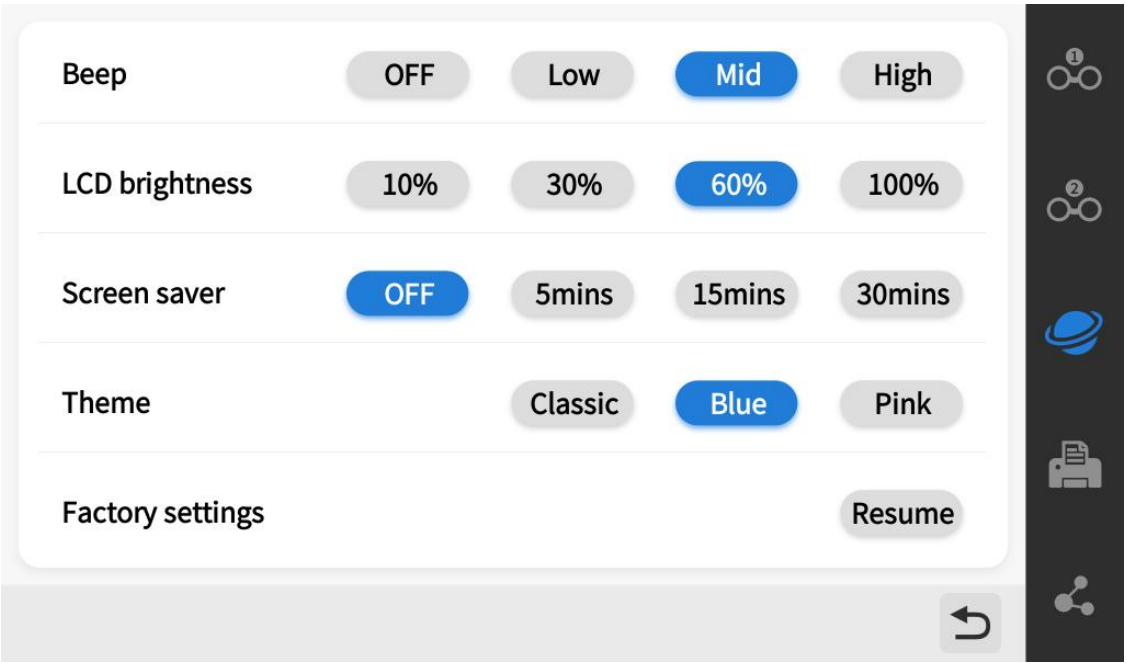
(Pic 34 Measurement parameter ② settings)

Measurement settings ② parameter list

Parameter	Configuration	Description
Measurement mode	Auto, NORM, PPL,CL	Choose measurement mode for measurement screen
Twist detection	OFF, ON	Twist detection on/off switch
Auto R/L	OFF, ON	Framed lens mode to L/R mode switch
Auto read	OFF, Fast, Center	Reading conditions under auto read mode
ADD detection	Manual, Auto	Add mode Manual /auto

Device settings

Device setting menu is as shown in picture 35below.



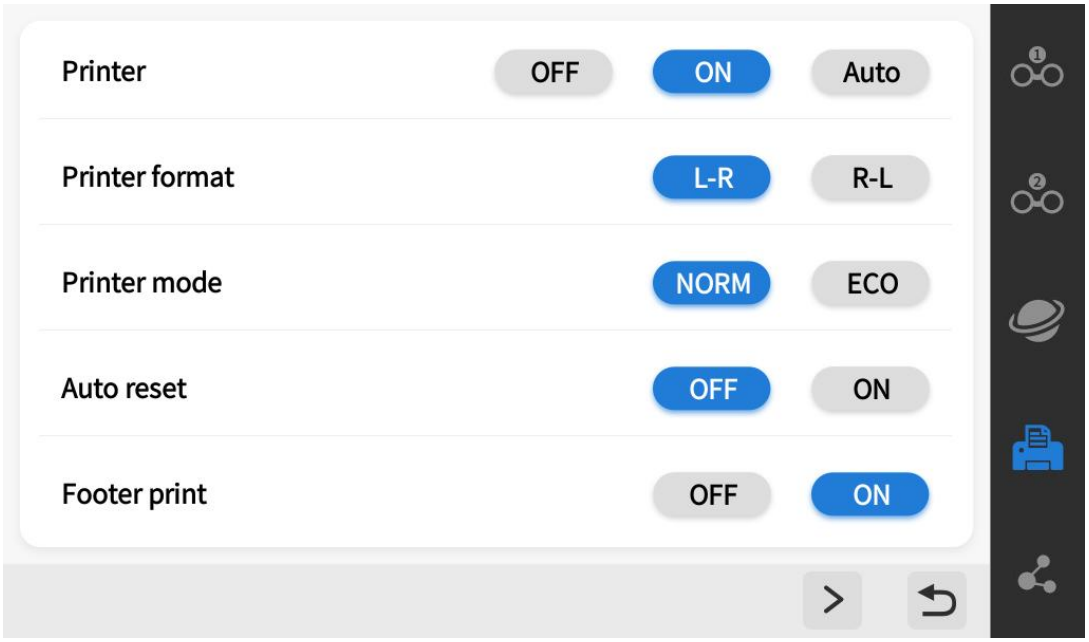
(Pic 35 Device parameter settings)

Device setting parameters

Parameter	Configuration	Description
Beep	OOF, Low, Mid, High	Button and measurement notification sound and volume adjust
LCD brightness	10%, 30%, 60%, 100%	LCD brightness adjust
Screen saver time	OFF, 5mins, 15mins, 30mins	Time to wait before entering screen save when not operating the device
Theme	Classic, Blue, Pink	Choose a themed color for the interfaces
Factory settings	Resume	Resume factory settings

Print settings

Printing settings menu is as shown in picture 36 (page 1) and 37 (page 2).



(Pic 36 Printing setting page 1)



(Pic 37 Printing setting page 2)

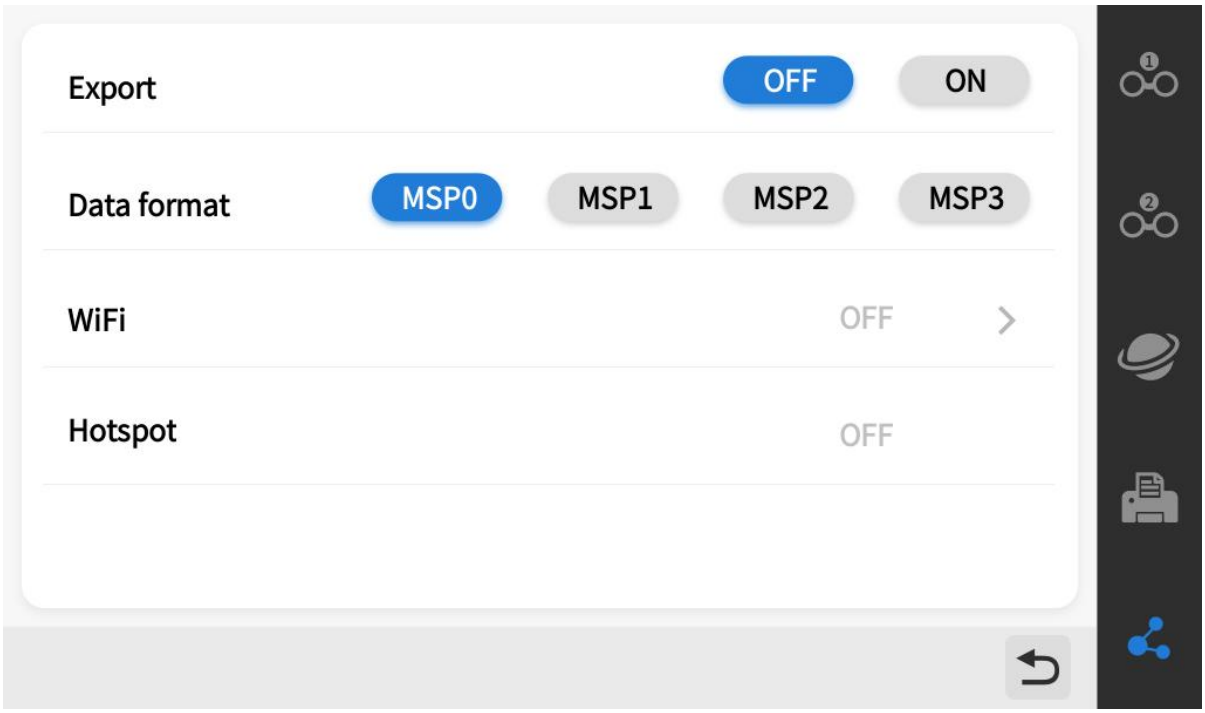
Printing parameter setting list

Parameter	Configuration	Description
Printing	OFF, ON, Auto	Printing function on/off switch
Printing format	L-R, R-L	Format of the printed ticket
Printing mode	NORM, ECO	Normal printing or printing with smaller line spaces
Auto reset	OFF, ON	Auto reset function switch on/off
Footer print	OFF, ON	Footer display on/off
Date and time	OFF, ON	If print date and time on the ticket
Date format	MM/DD/YYYY, YYYY/MM/DD	Date format setting

Date and time setting	Time	Set the device date and time
Footer	Information display	Input footer information to be showed on the printed ticket

Connection settings

Connection settings menu is as shown in picture 38.



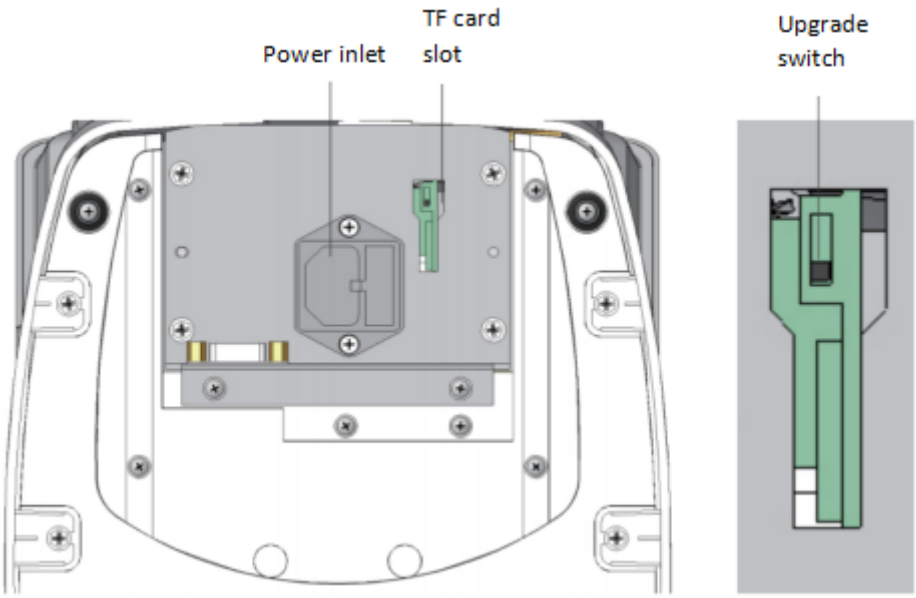
(Pic 38 Connection settings)

Connection settings parameters list

Parameter	Configuration	Description
Data export	OFF, ON	Printing function on/off
Data format	MSP0, MSP1, MSP2, MSP3	Printed content format
WIFI	WIFI settings	
Hotspot	Hotspot settings	

6.11.2 Software upgrade

For easier software/program upgrade, there is a port under the device as shown in below picture 39:



(Pic 39 Software upgrade port)

Steps for software upgrade:

Power off the device (press the switch on the right side of the device make the “O” side down).

Insert the TF card containing the latest version of software into the TF card slot.

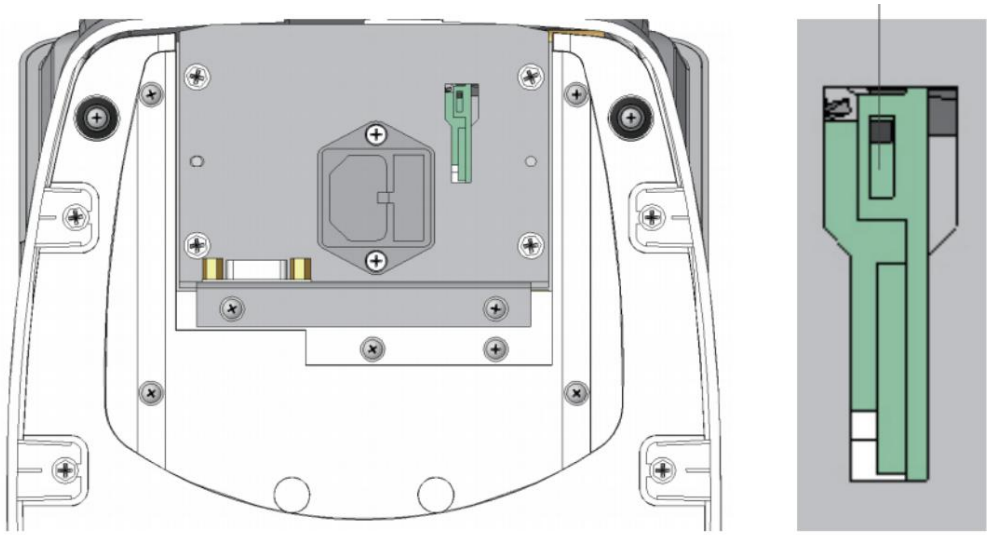
Push the dial switch to the position as shown in picture 39.

Power on the device (press the switch on the right side of the device make the “|” side down) and you will hear a beep from the device.

On the screen it will show notification of upgrade. When the process bar reaches 100% twice, the upgrade is finished.

Power off the device (press the switch on the right side of the device make the “O” side down)

Take out the TF card and push the dial switch to position as shown in picture 40. The upgrading process is finished.



(Pic 40 Connection settings)

6.11.3 Connection with other devices

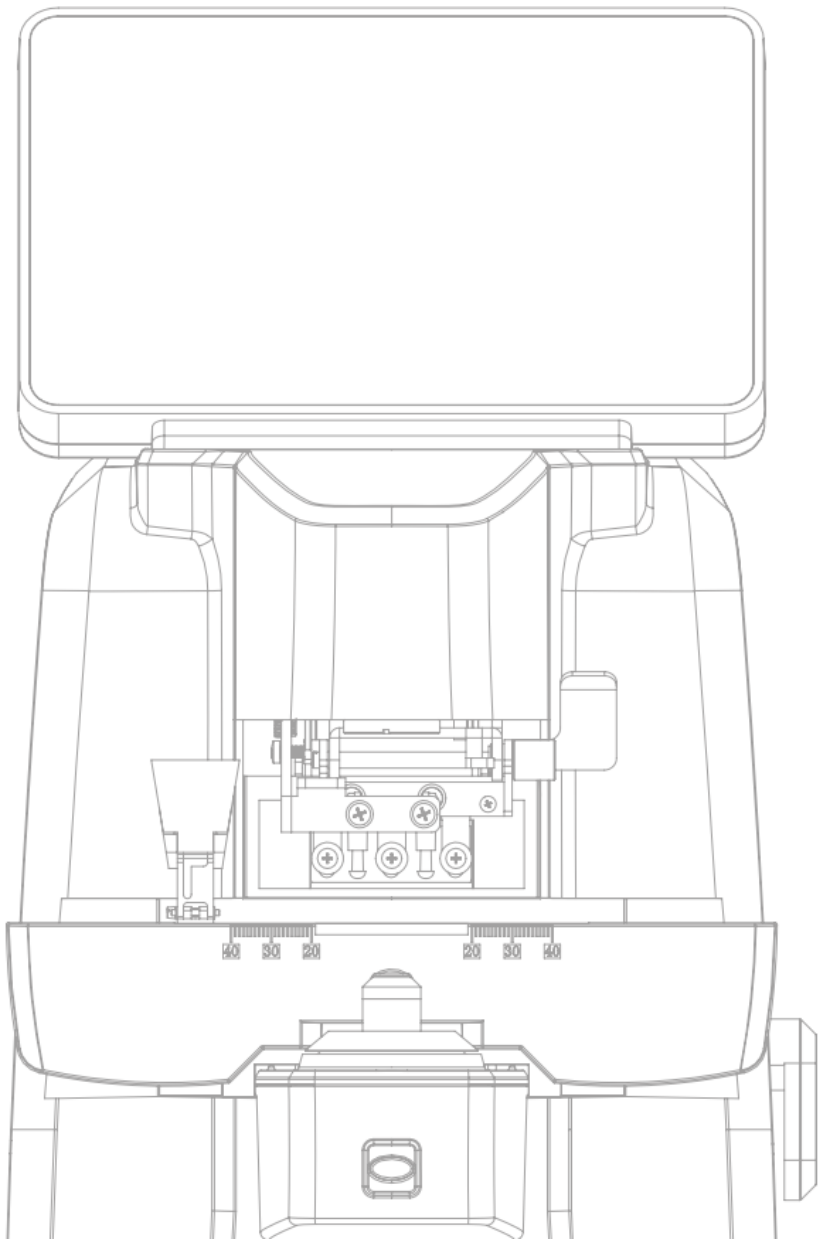
Any data that can be printed by the lensmeter can also be sent to other devices through RS232 communication (devices that supports the TL-6900 protocol recognition).

Connect the device with other device through the RS232 cable.

Choose the communication protocol of the target device.

After taking measurement and save the result, press the print button on the measurement screen to export the measurement result to other device.

7.Maintenance



7.1 Troubleshooting

Malfunction	Possible cause	Solution
LCD screen not lit up	No power supply for the unit	Check if power cord is well plugged in Check if the device is switched on(switch on position 1) Check is the fuse is burn
Printer not printing	Print function is not active	Go into setting menu and active print function
	Printer paper not loaded	Open the printer cover check for printer paper
	Not in printing condition	For non-single lens measurement, the result can only be printed when the measurement for both lenses finished
Can not select left/right lens	PD and PH	Move the nose slider or turn off PD PH
	Both left and right lens are locked	Press clear button to clear data

If the device still not working, please contact us or your local distributor.

7.2 Error Messages and Solution

Error message	Possible cause	solution
Optical system error	Optical system is blocked	Remove the objective blocking the system
	LED not lit up	Internal fault, please connect local distributor
Please remove lens on the lens support	Lens on the lens support	Remove lens and re-start the unit
	Initial parameter exceeds the factory preset value	Reset factory parameter
Please clear the optical path	Dust or grease on protective glass	Clean the protective glass according to chapter 7.5
	Initial parameter exceeds the factory preset value	Reset factory parameter
Sensor error	Sudden environment change during measurement, such as light path is blocked	Press clear button or restart the unit and measure again
	Sensor broken	Internal fault, please connect local distributor
Measurement error	Sphere, cylinder and prism result is out of preset range	Check lens power
	Lens is moved to edge position and impacting the optical patch	Check lens and move lens position
	LED light or sensor error	Internal fault, please connect local distributor
Testing optical system	Parameter exceeds preset value	Reset factory parameter according to chapter 7.6

7.3 Replace printer paper

Lift the printer cover to open as shown in picture 41 below.



(Pic 41 Open printer cover)

Take out the old printer paper roll. Replace with a new roll of printer paper and install to the right position as shown in picture 42 below.



(Pic 42 Replacing the printer paper)

⚠ Caution	Make sure the printer paper is in right size and put in the correct position, or it will not print properly

Close the printer cover, press on both sides of the printer cover to make sure it is well closed.

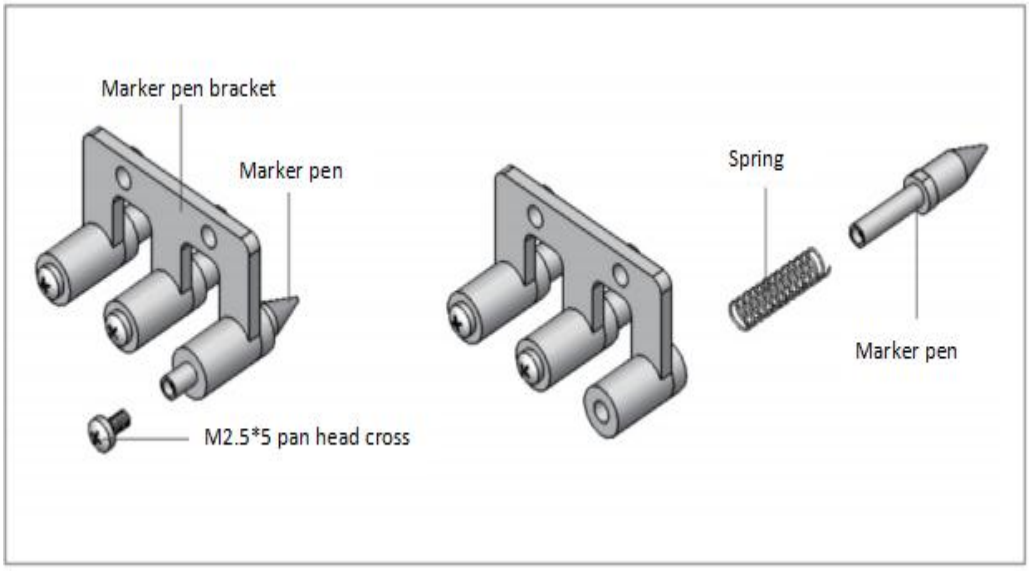


(Pic 43 Close the printer cover)

7.4 Replacing the Marker Inking Pens/Box

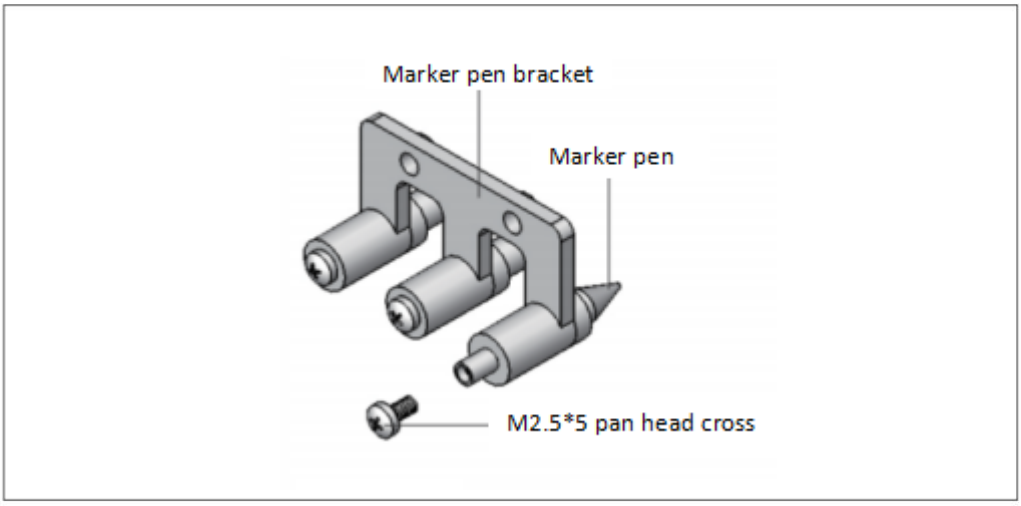
7.4.1 Replacing Marker Pens

Loosen the screw on the top of the marker pens, take out the screw, spring and the marker pen, see picture 44.



(Pic 44 Take apart the marker pens assembly)

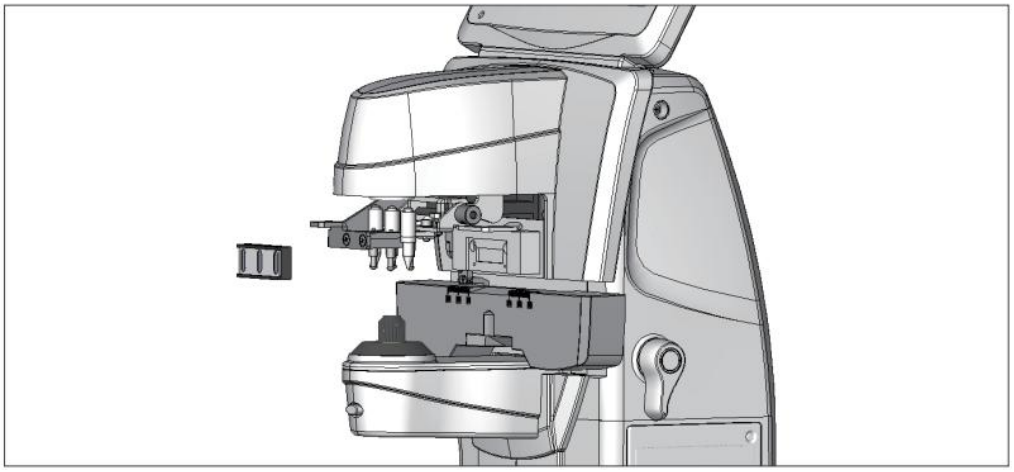
Install back the new marker pen and spring with the screw and tighten it as shown in picture 45.



(Pic 45 Install back the marker pen)

7.4.2 Replace the ink box

Take out the ink box from the device and replace it with a new one as shown in picture 46 below



(Pic 46 Replacing ink box)

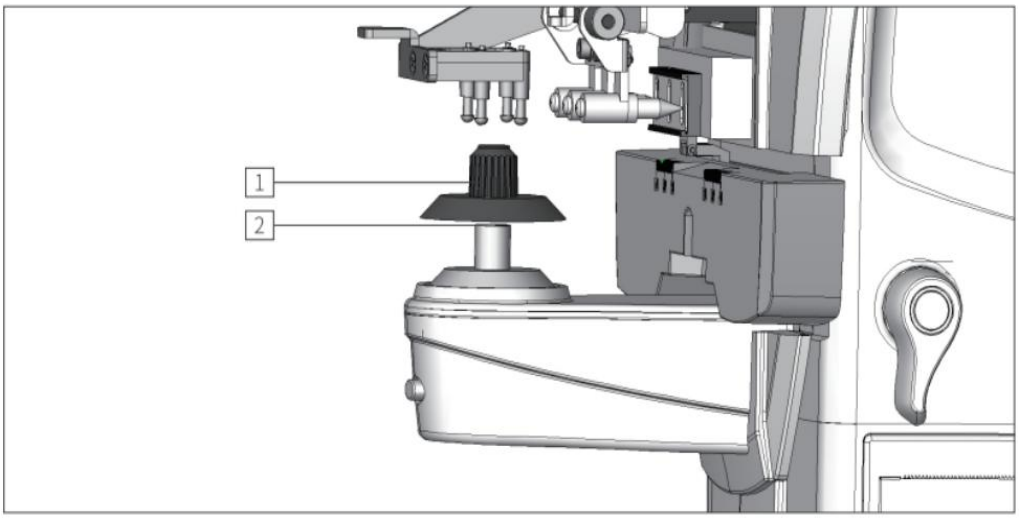
7.5 Clean the unit

7.5.1 Clean the protective glass

Take off the lens support (part 1 in picture 47).

Use soft brush or lens paper to clean the dust or grease on the protective glass (part 2 in picture 47).

Put back the lens support. Make sure it is in the right position or it will cause error in measure result.



(Pic 47 Clean the protective glass)

⚠NOTE	Do not scratch the protective glass. Scratches on the glass may lower the unit measure accuracy.

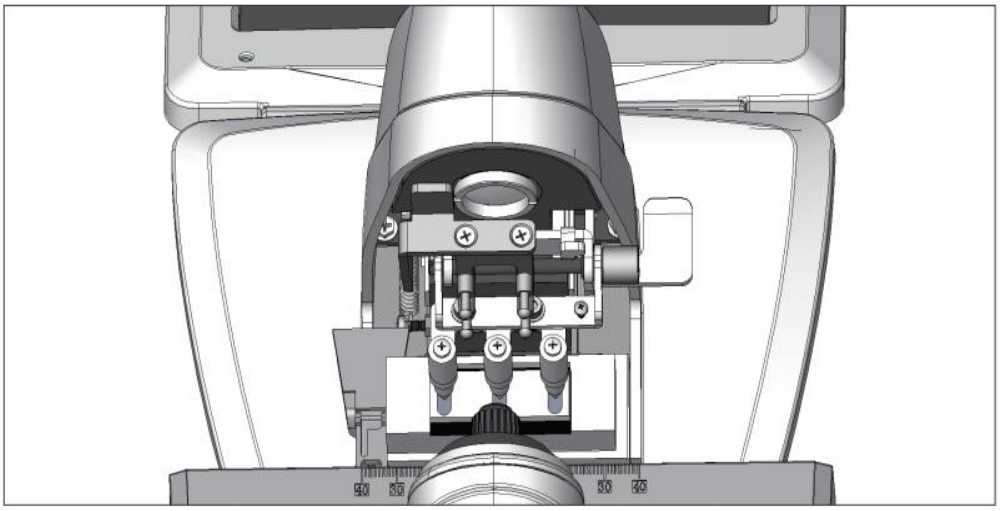
7.5.2 Cleaning the optical lens cone glass

Lower the lens holder system to leave enough space for cleaning.

Use soft brush or lens paper to clean the surface of the glass.

Put back the lens holder system.

⚠ CAUTION	DO NOT use sharp project to scratch the lens



(Pic 48 Clean the lens cone)

7.5.3 Clean the unit surface

Use soft dry cloth to clean the unit surface. If the dirt still remains, use cloth dipped with neutral reagent then use dry cloth wipe again. Note: DO NOT use organic solvent or gasoline to clean the unit.

⚠NOTE	DO NOT use organic solvent or gasoline to clean the unit. DO NOT leak any liquid into the inner of the device, or it may break the device.

7.6 Replace fuse

- Power off the device and unplug the power cable.
- Open the fuse cover on the power socket (gently with tweezers).
- Replace the fuse.

⚠CAUTION	The fuse for the lens meter is F1AL250V. Not using the correct fuse may break the device or causing other incidents.

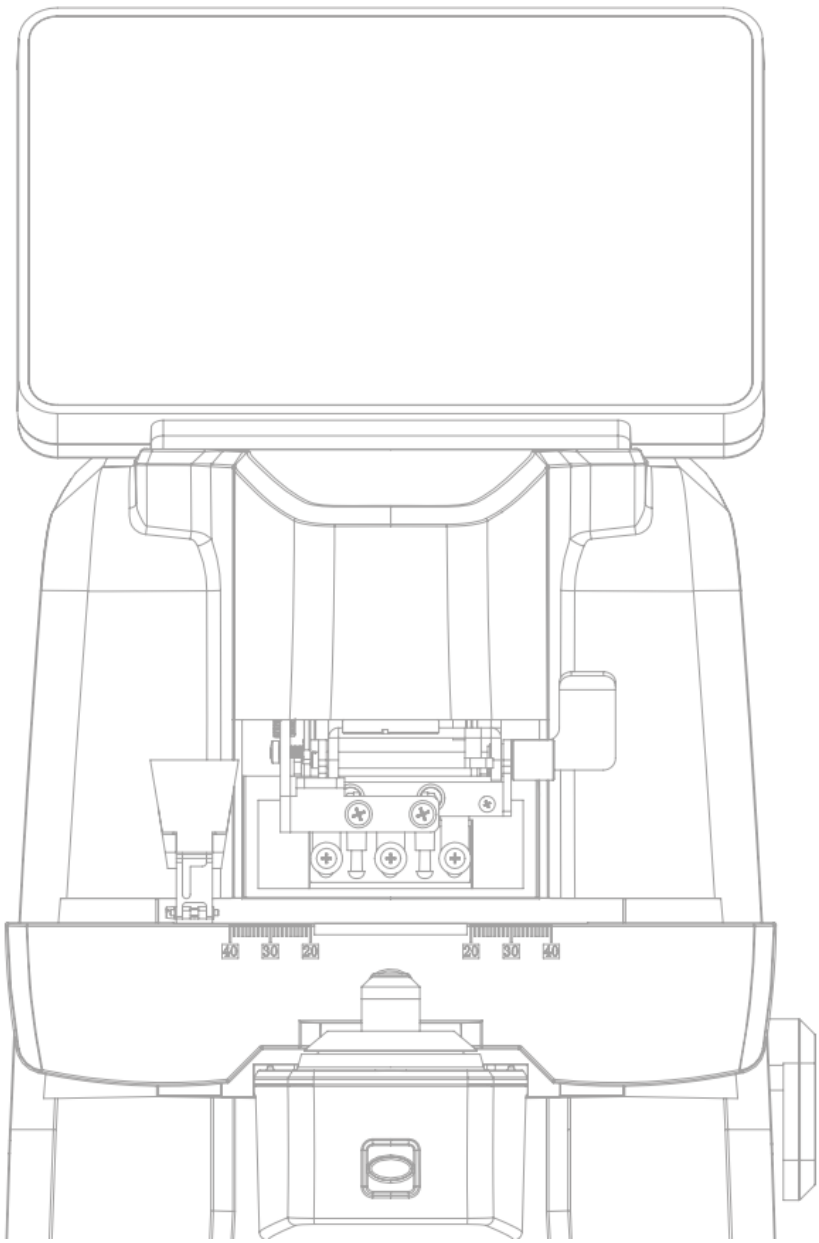
7.7 Preventative check, maintenance and frequency

- Use the standard lens for preventative check.
- When there is non-conformity, please report to Ningbo Ming Sing Optical R&D CO., Ltd immediately for re-calibration or repair.
- The device shall be calibrated or checked every 6 months.
- Clean the device at least once a month according to part 7.5.

7.8 Scrap

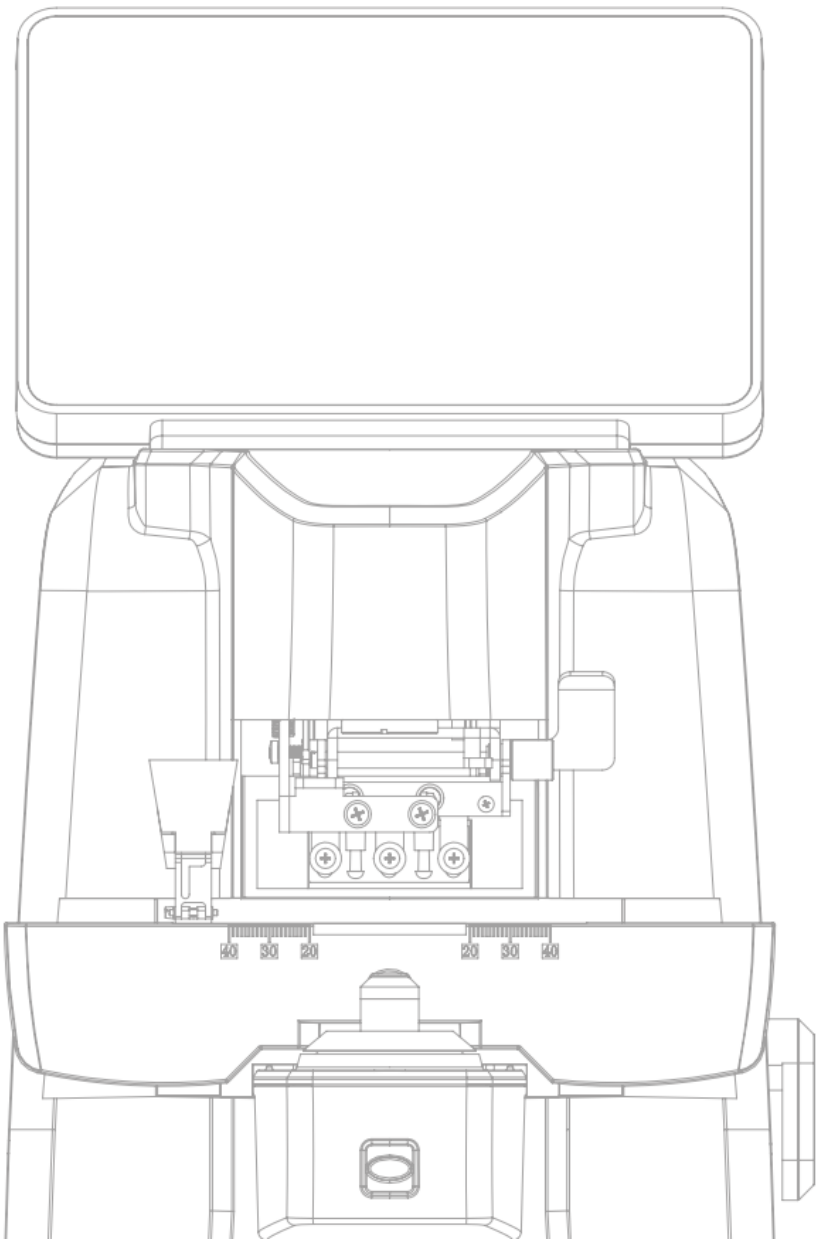
⚠CAUTION	• The disposal of scrap products and accessories need to comply with the relevant laws and regulations of local government. The product or lithium battery scrap, especially lithium batteries may cause pollution to the environment. • The disposal of waste packaging material shall comply with the relevant laws and regulations of the local government.

8. Accessories



NO	Description		Qty
1	Lensmeter		1
2	Built-in parts	Printer	1
		Printer paper	1
		1Afuse	2
3	Printer paper		1
4	Power cable		1
5	Product qualification		1
6	User manual		1
7	Packing list		1
8	Contact lens support		1
9	Dust cover		1
10	Ink box/marker pen		1
11	Ink (optional)		1

9. Information



9.1 Use life

The use life of this device is 8 years (starting from use of the first time)

Manufacturing date: see product label

9.2 Disclaimer

The manufacturer shall be responsible for the safety, reliability and performance of the product if:

(1)Install according to the instruction manual.

(2)Use and maintain according to the instruction manual and service manual.

⚠WARNING	The manufacturer shall not be held responsible for any problems caused by the alteration of the instrument without permission. The altered instrument will not be within the scope of the manufacturer's commitment.

Manufacturer

Ningbo Ming Sing Optical R&D Co., Ltd.

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Zip Code: 315104

Tel:0574-87198788,0574-87305541,0574-87296162

Fax:0574-87296439,0574-8729616

After-sales service provider

Ningbo Ming Sing Optical R&D Co., Ltd.

Address: NO.365 Middle Jingu road, Panhuo street, Yinzhou District, Zhejiang Province

Zip Code: 315104

Tel: 0574-87198788 Fax: 0574-87296439 Hotline: 400-168-6060