

User's Manual For Electronic Keratometer

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Introduction:

Dear User:

Welcome to use CCE-SW100 Electronic Keratometer.

We introduce this instrument to you by two parts: interface and operation. This User's Guide is designed as a training and reference manual. We recommend you read carefully and follow the steps in this guide to ensure that the machine would have optimal performance.

Product Performance:

Electronic Keratometer is made of three parts, including light source, Measurement of optical system and display system. To focus, the operator need make the unit up and down, , back and forth. When the focusing condition is met, When all the four image points are in the center of the screen, instrument will calculate automatically the curvature radius and diopter and display the result on the screen.

Technical Data

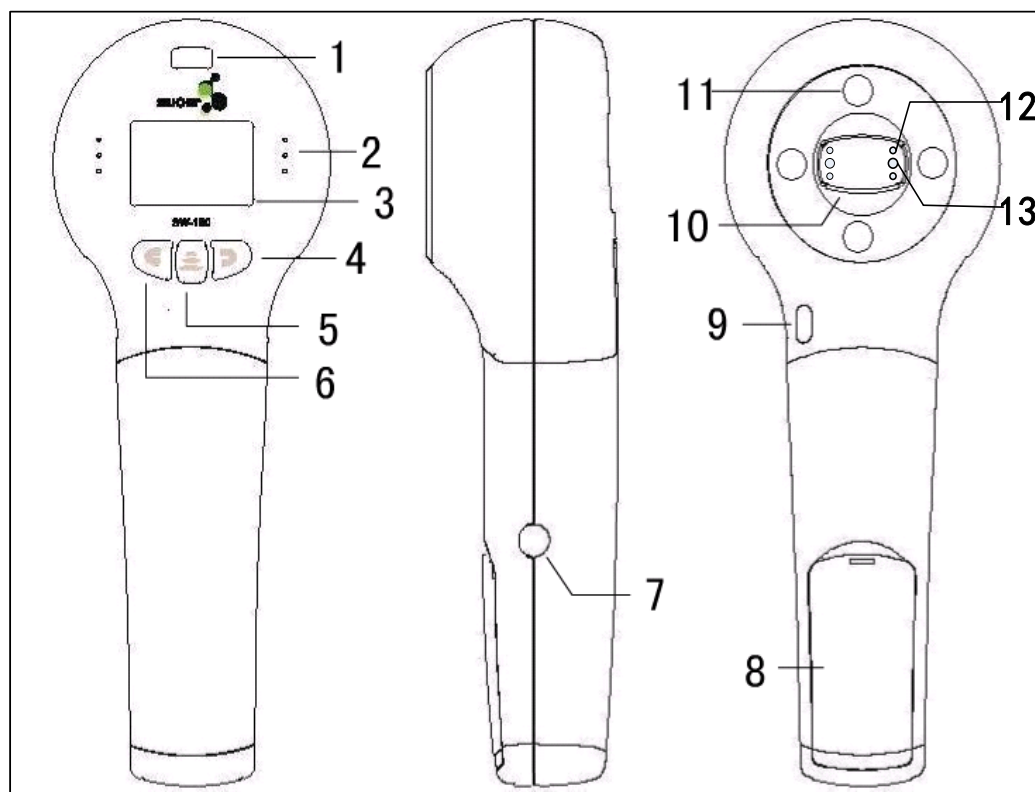
- Measuring range: 6.5mm~9.5mm curvature radius
- Center measuring area of Corneal Radius: Φ 3mm~ Φ 4mm;
- Digital Display Resolution of curvature radius: 0.01mm;
- Precision of curvature radius of cornea: \pm 0.05mm;
- Axial resolution of the main meridian: 1° ;
- Radial deviation of the measurement of the main meridian
- a) curvature radius deviation of the main meridian \leq 0.3mm, measurement of main meridian axial deviation: \pm 4 $^\circ$;
b) curvature radius deviation of the main meridian $>$ 0.3mm, measurement of main meridian axial deviation: \pm 2 $^\circ$;
- Output: Wireless infrared thermal printer;
- Voltage: DC4.5V (three AA battery) ;
- Rated input power: 500mW+15%;
- Weight: <0.5kg;
- Dimension: 240mm×90mm×60mm.

Configuration

1.Main configuration

Electronic Keratometer is made of three parts, including light source, Measurement of optical system and display system.

2.Parts and functions



Pic1

1. Level instrument: show level degree of the keratometer.
2. Speaker: "beep" after the completion of one measurement.
3. Display screen: show position of light spot and measurement results.
4. Left eye button: use to measure the left eye.
5. Print button: print the measurement results.
6. Right eye button: use to measure right eye.
7. Power switch: turn on of off the power.
8. Battery case: three batteries included.
9. Infrared sensor: transfer signal with infrared printer.
10. Lens: receive reflect lights and reflect them to the optical sensor.

11. Parallel illuminant: emits four parallel lights which are strictly symmetrical to the center with a certain angle between each other.
12. Infrared illuminant: during the focusing process, four infrared light will be emitted.
13. Focusing point illuminant: fixed with the relative position of level two parallel light, to determine the focusing position.

Applicability

Electronic keratometer is a precise optical measure instrument, designed for detecting curvature radius and diopter of cornea in hospital.

Measuring contraindications



The following inflammation may result in error measurement:

Keratitis, corneal ulcers, conjunctivitis, corneal edema, Corneal postoperative and other patients with irregular corneal.

Safety classify

Device type: Type B, power inside, normal device.

Symbolic description



Type B



Power



May destroy the device, indicate how to prevent.



Help you use the unit in a better way.

Notice

- ➡ Before operate the unit you should through the company training.
- ➡ You must take off the battery when it lie idle for a long time.

Environmental requirement

Transport and save:

Ambient temperature: $-40^{\circ}\text{C} \sim +55^{\circ}\text{C}$

Relative moisture: $\leq 95\%$

Atmospheric pressure: $500\text{hPa} \sim 1060\text{hPa}$

Working;

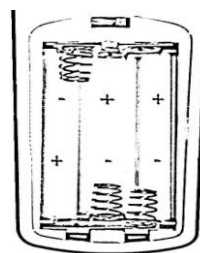
Ambient temperature: $+5^{\circ}\text{C} \sim +40^{\circ}\text{C}$

Relative moisture: $\leq 80\%$

Atmospheric pressure: $700\text{hPa} \sim 1060\text{hPa}$

Installation

1. refer to the packing list, and check missing
2. Put the battery in the battery compartment
3. Press the power button and start the unit



Pic.2

How to use

1.Display screen

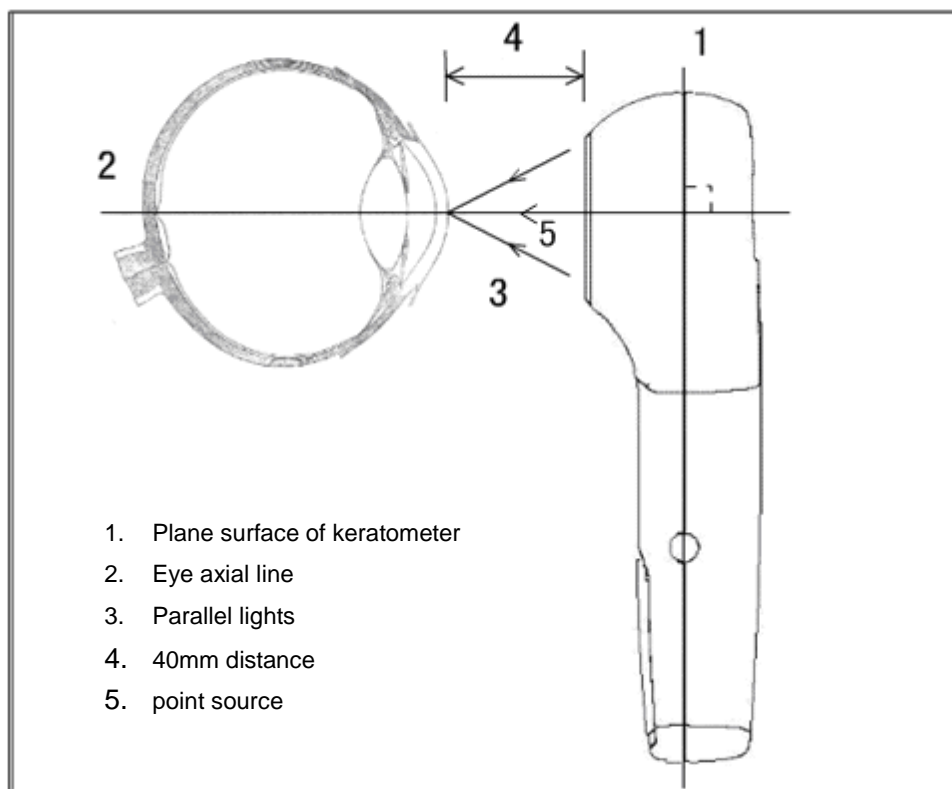
Pic .3 is the display screen. The readings on the left are for the right eye, while the readings on the right are for the left eye. They are (from top to bottom):

Curvature radius of long axis (or diopter) of long axis	7.98		7.98
Curvature radius of short axis (or diopter) of short axis	7.78		7.78
Axial angle: (unit: degree)	20		20
Measurement times	5		5
Mean variance of curvature radius (or diopter) of long axis	0.01		0.01
Mean variance of curvature radius (or diopter) of short axis	0.00		0.00



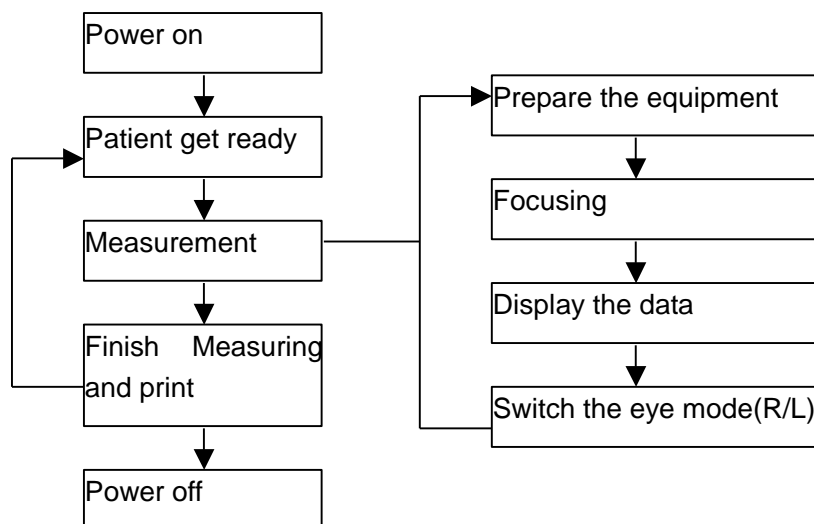
Collected data has two way of display: the radius of curvature display and refraction display. Click both left and right button to switch.

2.How to measure



Pic.5 Right position when measuring

3.Measurement process



Pic. 6

Patient preparation

Let the examinee look at the green point in the keratometer with a best posture to cooperate with the

examiner. Ensure that the keratometer plane perpendicular to the axial of the patient, the handle is parallel to the nose of patient.

Measurement and print

1 Prepare:

Switch on and press the measure button to turn on the four illuminates (press left eye button to measure left eye and press right eye button to measure right eye). Hold the bottom of the keratometer and place it at a distance 50mm from the cornea.



Measure symbol “==”: when measuring right eye, this symbol appear at right eye data display area; when measuring left eye, the same with measuring tight eye

2 Focus:

Remind the patient look at the green point in the keratometer, adjust it, ensure the pupil in the middle of the screen, then move the Keratometer from far to near. Be sure the pupil in the middle of the screen. Now the screen is high light, the eyeball, iris and pupil is show in the screen. When getting close to cornea, light spot gradually focused clear location(near the measurement point). The infrared light will close after the keratometer turn into the measurement state, the screen dimmed, and the focus hint appears.

3 Print:

The keratometer will give a short “beep” after each measurement, and each eye can be measured 5 times continuously with this keratometer. A long “beep” will be given after completion of 5 measures and the average will be shown on the screen. If it is less than 5 times, average of these measurements will be also shown on.



If there is no operation more than one minute, the program automatically enters sleep mode, press the button, it can wake-up, the measuring data will not lost.



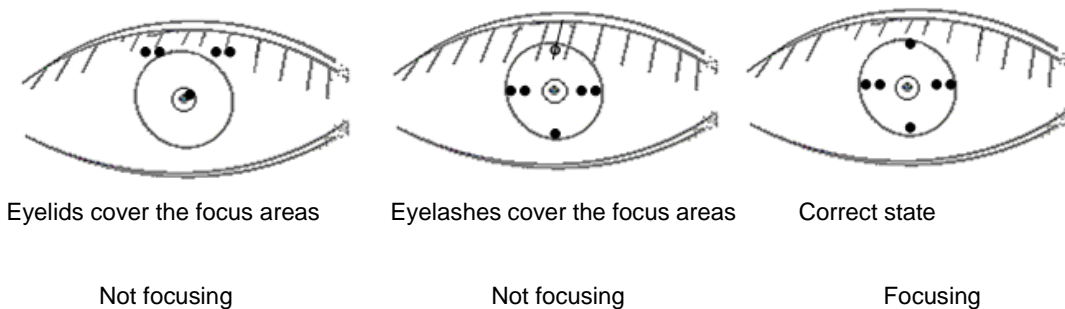
If you want to stop measuring, ensure power off, in the sleep mode, Light source of level bubble is still on.

5. Notes in measuring

1) Measurement position

Right hand hold Keratometer handle, the left hand support it(to prevent the small-scale shaking while it hang in the air), Keep Keratometer plane perpendicular to the axial length.

2) Eye preparation



Pic. 7

3) Focus hint



Pic.8


Forth and back focusing: When appearing real line, make the keratometer close to the eyeball, when the broken line appear, make the keratometer far away the eyeball.


Display plane: Six light spot should be in the center of the screen, the deviation from the center farther away, the longer the voice of the speaker, whereas the more rapid, suggesting that move to the opposite side.

Second Focus: After focus has been completed. The Keratometer shaking, eyes closed for too long or other reasons, resulting in less than six light spots detection, the program will automatically exit measurement and re-focus.


If there is " * * * " at the bottom of the screen center, , that's because the focus point is too large.

4) Measuring effectiveness


 If the standard deviation of long axis or short axis radius curvature below 0.02, then the effectiveness of measurement is not high, we suggest retest again. This may due to high-frequency flutter eye, tear film breaking or operator shaking hands and so on.


 Measured with different manufacturers product, due to different design, they measure corneal curvature in different regions, so measurement results are also different. This is not absolute error, but measurement of regional differences.

Environmental light shines on the cornea will produce stray light, this will make a effect on measurement

 results. So you'd better test the patient in the room where there is little light, like dark room.

Battery

 If the battery shaped icon appears above the display screen, the battery is low, less than 1 hour battery life remaining.

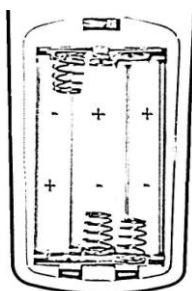
 If you continue to prolonged use, when the power is low, the machine will automatically enter the sleep state.

Replacing the battery

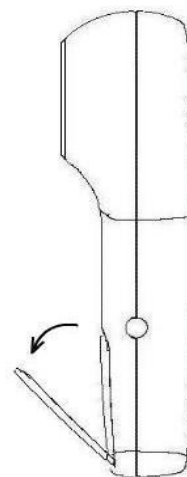
Hold the keratometer with one hand, press the upper part of the battery cover with another hand to open the cover(see Pic 9&Pic.10), put into three batteries , pay attention of the batter direction(see Pic.11). Then cover it. Put the batter on the cloth band, so that the batter can esaily take off.



Pic.9



Pic.10



Pic.11

Product maintenance

1.Routine maintenance

1. This instrument should be store in a place with good ventilation, and without direct sun irradiation.
2. Don't use organic solution to clean the instrument, like thinner, or it will cause instrument corrosion.
Avoid any water or other liquid filtering into the machine. Switch off before cleaning.
3. This ketatometer is a delicate instrument, don't press, shock or drop it with strength.
4. Check the batteries periodically to see if they are corroded. If the machine hasn't been put into use for a long time, the batteries should be taken out.
5. Don't try to disassemble the machine yourself when there comes a problems. Please contact the company or the sales person.

2.Cleaning lens

The screen, lens and illuminants of this instrument should be wiped with special tissue to avoid any laceration.

3.Calibration

1. Keratometer should calibrate with standard eyeball which used for cornea measuring ;
2. After keratometer repairing, it calibrate with standard eyeball which used for cornea measuring

Package and transport

Packed Keratometer is not allowed transport with flammable, explosive, corrosive items at the same time, It should keep away from shock, severe vibration and moisture in the transportation.

Curvature should be stored at ambient temperature -20 °C ~ 55 °C, relative humidity of 10% to 100%, non-corrosive gases, strong mechanical vibration, shock and magnetic field environment. Avoid direct sunlight, with good indoor ventilation.

Trouble shooting

If the instrument is not working properly, please refer to the table below. If the problem persists, please contact the company or dealer

Fault	Reason	suggestion
No response on screen	<ul style="list-style-type: none"> • Not power on; • Batter is dead; • Forget put in battery; 	<ul style="list-style-type: none"> • Power on; • change a new battery; • Put in batter;
In the easurement process, the screen flashing or system halted	<ul style="list-style-type: none"> • Batter is dead; • Software system is defective; 	<ul style="list-style-type: none"> • change a new battery • Restart, if still not working please contact with us.
Can't capture the six light spot, or the light spot is irregular	<ul style="list-style-type: none"> • Light path with failure; • Light source and lens is uncleanly; • Eyelids and eyelashes cover the eyes and or focus area; • Patient's eyes with tear; • Patient lost tear film; • Cause local scar; 	<ul style="list-style-type: none"> • Please contact with us; • Clean the lens or the light source • Adjust the measurement position or increase the openness of the eyelids; • Open and close the eyes several times, eliminating tears; • Open and close the eyes several times improve the tear film, and then operate; • Adjust the placement of light spot
Continuously measure several times, the standard deviation is more than 0.02	<ul style="list-style-type: none"> • The posture of operator or the patients is not correct, in the measuring process, shaking is more powerful • Tear film break; 	<ul style="list-style-type: none"> • Re-adjust the position, ensure that the Keratometer plane and axial corneal curvature is perpendicular. • Validity of measurement is not reliable.
Can't get the measured data	<ul style="list-style-type: none"> • Caused by ambient light, stray light on the screen, or the light spot is not round, etc • Keratometer plane and the axial curvature is not vertical, resulting in light spot is not round and streak • Focusing distance too close to cornea; • When focusing it is too fast to approach the cornea; • Severe corneal edema; 	<ul style="list-style-type: none"> • Take the measurement in the dark room. • Adjust the Keratometer, make it Perpendicular to the axial • At a distance of 40mm away from the center of the cornea, start approaching the cornea to focus • In the approximation process of the cornea, the speed can't be too fast , or else it'll missed the focus position. • Can't be measured;
Can't print data	<ul style="list-style-type: none"> • No paper to print • Printer paper jam 	<ul style="list-style-type: none"> • Check if there is print paper, and if not, put in printing paper • Check if the Printer paper is jamed ,if it is,

	<ul style="list-style-type: none"> • There is no data currently 	<ul style="list-style-type: none"> • draw out the printer paper. • Check if the current interface has a valid data.
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Warranty:

All the accessories should be well kept. If anything is missing, the instrument could not be warranted.

This instrument had been strictly inspected and tested before putting into sales. We will offer free service or change defective parts only in the warranty period. But it will not prolong the warranty period, and the replaced defective part should be sent back to China Care company. We will not take the responsibility if it is broken because of the wrong operation of user.

All the pictures in this guide is for reference only, please see practicality as standard.

Users to purchase their own printer with infrared interface

Keratometer Packing List

CCE-SW100

No.	Name	Amount
1	Main unit	1
2	Battery	3
3	Use's Manual	1
4	Certificated	1
5	Maintenance card	1
Optional: Infrared Printer		