Refracto-Keratometer
User's Manual

Please be sure to read this manual carefully before using the instrument and keep it handy for ready reference.

CONTENTS

Thanks for your choice and use of this instrument.AR (k) - 1 refractometer is a kind of precise instrument which uses shack Hartmann wavefront sensing principle and precise image

analysis and processing technology to objectively measure human eyes. The instrument is used to measure ametropia in adults and children, including spherical diopter, cylindrical diopter and optical axis, pupil distance and / or corneal curvature parameters.

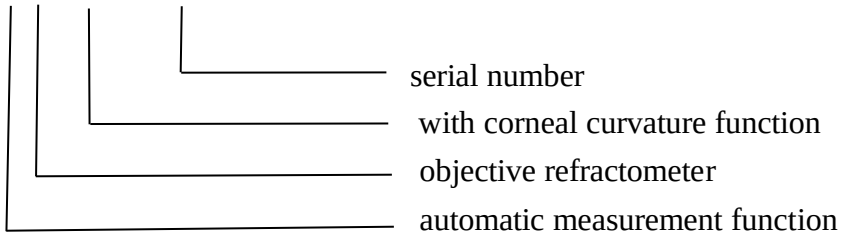
The measured data can be displayed on the screen or printed by pressing the print key.

Model No./Specifications

Item No.	Spec.(L x W x H) (mm x mm x mm)	Input Power (VA)	Display mode	Remarks
AR-1	451×309×502	60	liquid crystal	Wavefront Aberration(Auto)
ARK-1	451×309×502	60	liquid crystal	Wavefront Aberration Corneal Curvature(Auto)

Auto Refracto-Keratometer Named

A R（K）- X X



Structural composition

This series of refractometer is composed of optical part, mechanical transmission part, software control part (ver 1.0), display part and printer.

DISCLAIMER

1、 This manual has been carefully checked to insure the contents’ accuracy and perfect during compiling, however, for possible errors or omissions contained herein.

2、 The company reserves the right to make changes to this product or the specifications at any time without prior notice.

3、 The company own the final interpretation to this manual.

1. ELECTROMAGNETIC COMPATIBILITY GUIDE AND MANUFA-CTUTER STATEMENT

This product is in compliance with the electromagnetic compatibility regulations in this manual. To ensure compliance with these regulations, the user needs to install and use the information provided in this manual. Such as the use of non - manufacturers to provide the cable may cause the increase or decrease in the immunity of the product launch.

Warning:

1. The use of non - manufacturer supplied cables may cause an increase in the electromagnetic radiation of this product or decrease the immunity.

2. Portable or mobile RF communication equipment shall not be used closer to any part of AR (k) - 1 refractometer, including cables, than recommended isolation distance.

3. In addition to the transducer and cable in sale as spare parts of components from the original equipment or system manufacturer, the use of other accessories, transducers and cables may cause an increase in the device or system to launch or decrease in immunity.

4. The device or systems should not be close to or stacked up with other devices, and if you have to approach or stack, it should be observed to verify the normal operation of its use.

5. The other accessories, transducer or cable to be used together with the device and system, it may cause an increase in the device or system to launch or decrease in immunity.

1.1 Electromagnetic Emission Guide and Manufacturer Statement(Form1)

Guide and manufacturer's statement—Electromagnetic emission		
[Prototype ARK-1]expected to be used in the electromagnetic environment of the following requirements, buyers and users should ensure that it is used in this electromagnetic environment		
Launching Test	Conformity	Electromagnetic Environment—Guide
Radio frequency emission GB 4824	Group 1	[**Prototype ARK-1**] Radio frequency energy to be used for internal function only. Therefore, its RF emission very low, and the possibility of interference in the electronic device is very small.
Radio frequency emission GB 4824	Class B	[**Prototype ARK-1**] Applicable for all of the facilities in use, including the home and the direct connection of residential public low voltage power supply network.
Harmonic emission GB 17625.1	Not applicable	
Voltage fluctuation/Flicker emission GB 17625.2	Not applicable	

1.2 Electromagnetic Immunity Guide and Manufacturer Statement (Form2)

Guide and manufacturer's statement—Electromagnetic immunity			
[**Prototype ARK-1**] expected to be used in the electromagnetic environment of the following requirements, buyers and users should ensure that it is used in this electromagnetic environment			
Immunity Test	IEC60601 Test Level	Meet Level	Electromagnetic Environment—Guide
Electrostatic discharge GB/T 17626.2	±6kV contact discharge ±8kV air dischange	±6kV contact discharge ±8kV air dischange	The ground should be wood, concrete or ceramic tile, if the ground is covered with synthetic material, the relative humidity should be at least 30%
Electric fast transient pulse group GB/T 17626.4	±2kV power line ±1kV input/output line	±2kV power line	Network power supply should have a typical commercial or hospital environment in the use of quality
Surge GB/T 17626.5	±1kV line to line ±2kV line to ground	±1kV line to line ±2kV line to ground	Network power supply should have a typical commercial or hospital environment in the use of quality

Power input line voltage dips, short interruptions and voltage variations GB/T 17626.11	<5%U_t, last 0.5 cycle (Above U_t, >95% sag) 40% U_t, last 5 cycle (Above U_t, 60% sag) 70% U_t, last 25 cycle (Above U_t, 30% sag) <5% U_t, last 5s (Above U_t, >95% sag)	<5%U_t, last 0.5 cycle (Above U_t, >95% sag) 40% U_t, last 5 cycle (Above U_t, 60% sag) 70% U_t, last 25 cycle (Above U_t, 30% sag) <5% U_t, last 5s (Above U_t, >95% sag)	Network power supply should have a typical commercial or hospital environment in the use of quality. If the users need [**Prototype ARK-1**] to continuously run during power supply interruption, then it's recommended the [**Prototype ARK-1**] is powered by a constant power supply or battery
Power frequency magnetic field （50Hz） GB/T 17626.8	3A/m	3A/m	The power frequency magnetic field should have the characteristics of the power frequency magnetic level in a typical commercial or hospital environment
Note：Ut refers to the AC network voltage before applying the test voltage.			

1.3 Electromagnetic Immunity Guide and Manufacturer Statement (Form3)

Guide and manufacturer's statement—Electromagnetic immunity			
[**Prototype ARK-1**] expected to be used in the electromagnetic environment of the following requirements, buyers and users should ensure that it is used in this electromagnetic environment			
Immunity Test	IEC60601 Test Level	Meet Level	Electromagnetic Environment—Guide

<table>
<tr>
<td>Radio frequency transmission GB/T 17626.6

Radio frequency radiation GB/T 17626.3</td>
<td>3 V (effective value)
150 kHz ～ 80 MHz

3 V/m
80 MHz ～ 2.5 GHz</td>
<td>3V (effective value)

3 V/m</td>
<td>Portable or mobile radio frequency communication equipment should not be used closer to any part of [Prototype ARK-1] refractometer than the recommended isolation by distance, including the cable. The distance should be calculated with the corresponding formula of the transmitter frequency. The recommended isolation distance:

$d=1.2\sqrt{P}$

$d=1.2\sqrt{P}$ 80MHz～800MHz

$d=2.3\sqrt{P}$ 800MHz～2.5GHz

In formula：P — Maximum output rated power of the transmitter provided by the manufacturer, unit for Watt(W)
d—Recommended isolation distance, unit for meter(m).
The electric field intensity of fixed radio frequency tra itter is determined by the investigation [a] of electromagnetic field, in each frequency range [b] should be lower than Meet Level. Interference may occur near the devices marked with the following items.</td>
</tr>
<tr>
<td colspan="4">Note 1: at 80MHz and 800MHz frequency point, use the formula for higher frequency bands
Note 2: these guidelines may not be suitable for all cases, because the electromagnetic propagation is influenced by the absorption and reflection of buildings, objects and human bodies.</td>
</tr>
<tr>
<td colspan="4">[a] fixed transmitter, such as wireless(cellular/cordless) telephone and ground mobile radio base station, amateur radio, Am and FM radio and television broadcasting, etc. the electric field intensity can not be accurately predicted in theory. In order to evaluate the electromagnetic environment of a fixed RF transmitter, the survey of electromagnetic field should be considered. If the electric field intensity measured where [Prototype ARK-1] place is higher than above applicable RF Meet Level, [Prototype ARK-1] should be observed to verify whether it can work normally. If abnormal performances happen, the supplementary measures may be necessary, such as re-adjust the direction or position of [Prototype ARK-1].
[b] in the entire frequency range of 150 kHz～80 MHz, the electric field intensity should be less than3V/m.</td>
</tr>
</table>

1.4 The Recommended Isolation Distance Between Portable and Mobile Radio Frequency Communication Equipments and [**Prototype ARK-1**] (Form 4)

The recommended isolation distance between portable and mobile radio frequency communication equipments and [**Prototype ARK-1**]

[**Prototype ARK-1**] expected to be used in the electromagnetic environment of the radio frequency radiation disturbance controlled. According to the maximum output rated power of communication equipment, the buyer or user may prevent the electromagnetic interference by maintaining a minimum distance to be recommended as following items between the portable and mobile radio frequency communication equipment(transmitter) and [**Prototype ARK-1**]

Maximum output rated power of transmitter: W	Isolation distance of different frequency of transmitter/m		
	150kHz～80MHz $d=1.2\sqrt{P}$	80MHz～800MHz $d=1.2\sqrt{P}$	800MHz～2.5GHz $d=2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

To the maximum output rated power of transmitter that not listed in the above forms,

d is recommended as isolation distance, unit for meter(m), the formula in the frequency column of the corresponding transmitter is available, here **p** is the maximum output rated power of transmitter provided by the manufacturer, unit for Watt(W).

Note 1: at 80MHz and 800MHz frequency point, use the formula for higher frequency bands

Note 2: these guidelines may not be suitable for all cases, because the electromagnetic propagation is influenced by the absorption and reflection of buildings, objects and human bodies.

2. SAFETY PRECAUTIONS

Safety Signs and Instructions ⚠Please note that the optical part of the equipment is equipped with class 1 laser products (according to GB7247.1-2012), which are emitted from the pupil. (in order to avoid harmful laser radiation, please consult the local distributor or manufacturer during assembly, maintenance and replacement. If the control or adjustment device is not used according to this regulation, or each step of operation is carried out, harmful radiation exposure may be caused.)

 ——Type B application part.

2.1 Operation

2.1.1 Don't optionally open and touch the inside parts of the instrument, it may cause an electric shock or the system may malfunction.

2.1.2 Please keep this instrument ground connection well to avoid possible injury to people or the instrument damaged.

2.1.3 Don't touch the screen(resistance touch-screen, contact and hold it for about 0.1 second) in too strong strength, it may damage the screen.

2.1.4 Don't put the instrument at the place of direct sunlight or too strong illumination, it may affect the measuring precision. It's strongly suggested to be used indoors or in darkroom.

2.1.5 Don't use the instrument in a hot, humid or dusty environment. Such environments cause bad influences to the instrument.

2.1.6 If you want to connect this instrument to other instrument, please follow our local agent's instructions.

2.1.7 In cold room, when temperature suddenly rise, dew maybe appear on the protection glass of measuring window or internal optical parts. In case this happen, it can be used till the dew disappear.

2.1.8 Keep the measuring window lens clean at all time. The dust and other substances may cause error in measuring or affect the measuring precision.

2.1.9 If you encounter any abnormal conditions, such as smoking or strange smells, turn off the instrument and pull out the power cord immediately. Contact the local experts/agent or original manufacturer to check and repair, you can use till the trouble is absolutely removed.

2.1.10 The use of materials that directly contact with the skin part: During operating the instrument, it should be used to separate the instrument from the patient's touch part with medical non-woven fabric(size for 8cm x 8cm), to avoid the direct contact with the surface of the instrument.

2.2 In Storage

2.2.1 Don't store the instrument in a place where it may get wet or where poisonous gas or liquid is stored.

2.2.2 Be sure to store the instrument in a place away from direct sunlight and with the specified temperature and humidity.

2.3 In Transference

2.3.1 During carrying the instrument, please take great care to avoid colliding and falling. Sudden or strong impact may damage the instrument or performances.

2.3.2 Before carrying, please turn off the machine and lock tightly the sliding body. During carrying, please catch the bottom tightly by two hands.

2.4 After Using

2.4.1 If the instrument won't be used for a long time, disconnect the power cable from the wall-outlet. It may cause a fire.

2.4.2 When the instrument is not used, turn the power off and put the dust cover on. Keeping the machine in electricity supplying will reduce the use life of the instrument. If the instrument is not covered for a long time, dust may affect the measuring accuracy.

2.5 In Maintenance

2.5.1 It's one high precision optical instrument and need to be calibrated regularly.

2.5.2 Please fill the lube to the sliding parts regularly at the experts' guide.

2.5.3 Be sure to replace the fuse after disconnecting the power cord from the power inlet and use the specified fuse for replacement. Otherwise, it may cause a fire.

2.5.4 In case the instrument breaks down, it must be checked and repaired by the specified experts who know this instrument very well, or contacting the local authorized agent or original manufacturer. Open and repair the instrument by oneself, the agent or manufacturer don't be in charge of the consequence.

2.5.5 This instrument for non sterile medical device. Daily cleaning and disinfection of device by end user. Please use a soft cloth or sponge, wet cloth or detergent to clean the device. Don't use alcohol, water, benzene and other organic compounds to clean the surface of the instrument, to avoid damage to the device. The measuring window is often cleaned by a soft cloth to remove dust to maintain the accuracy of the measurement.

2.5.6 Determination of disinfection method:

According to the requirements of "environmental and object surface disinfection" in the hospital disinfection and sanitation standard of GB 15982-2012, the general components of the device are cleaned in time, the chin-rest and forehead rest and operation lever are demanded to be disinfected in middle level disinfection.

In accordance with the regulations of the WS/T 367-2012 medical institutions disinfection technical specifications, the chin-rest and forehead rest and operation lever are demanded to be disinfected by using alcohol disinfectant, and use 75% (volume ratio) ethanol solution to wipe the surface of the object.

3. UNPACKING AND INSTALLATION

3.1 Notices and Procedures of Taking out the Instrument

Catching the bottom and chinrest frame separately by two hands, don't catch the screen or operation lever（Figure 1）

Figure 1

3.2 Power Line Inlet and RS232 Interface（Figure 2,Figure 3）

Connect the spare power line with the power supply socket (RS232 interface connection demanded, please contact the original manufacturer or local agent)

Figure 2

Figure 3

Power socket　AC power access (including fuse) fuse: F5aL 250V

The data interface USB / RS232 interface is used to connect external equipment (the refractometer and the automatic optical head system connected shall meet the relevant electrical requirements in GB9706.15-2008.

3.3 Chinrest Paper Installation

Use the specified chinrest paper（Figure 4）

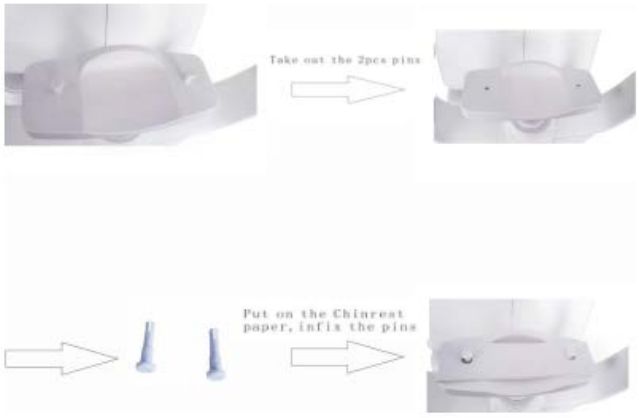


Figure 4

4.APPEARANCE STRUCTURE NAME AND FUNCTION INTRODUCTION

Front（Figure 5）

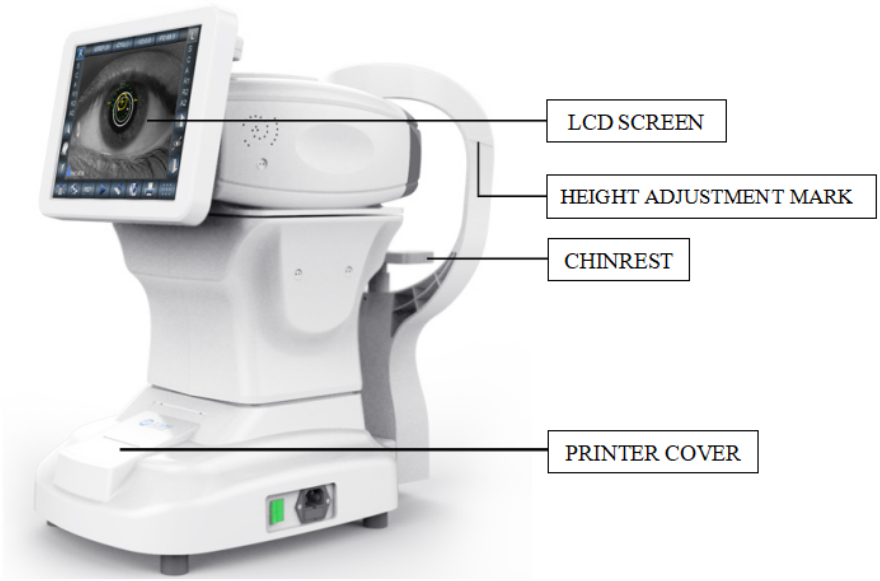


Figure 5

LCD Screen: Monitor for measurement display

Height Adjustment Mark: The eyes' height position of the patien

Chinrest: The platform for placing the patients' chin

Printer Cover: Press the cover to open or close

Back（Figure 6）

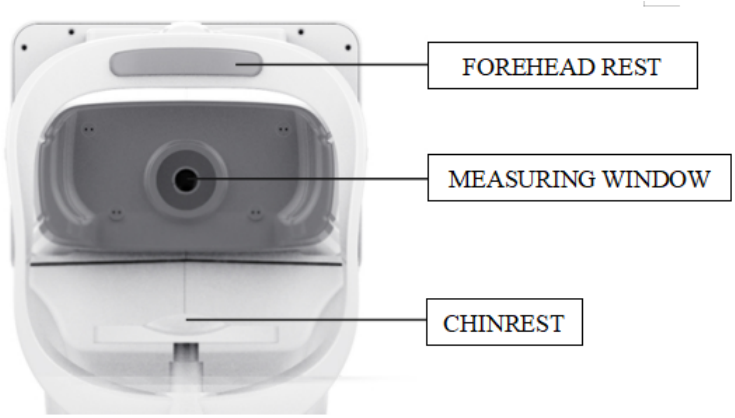


Figure 6

Forehead Rest: The place against the patients' forehead

Measuring Window: Imaging on the retina of the patients' eyes

Chinrest: The platform for placing the patients' chin

5. MAIN TECHNICAL INDEXES

5.1 Measurement Performance Parameters

5.1.1 SPH: -20.00 m^{-1}~ +20.00 m^{-1}(VD=12mm，0.01 m^{-1}、0.06 m^{-1}、0.12 m^{-1}、0.25 m^{-1} unit), deep myopia measurement available

5.1.2 CYL: 0.00 m^{-1} ~ ±10.00 m^{-1} (0.25 m^{-1} unit)

5.1.3 Axis(AX): 1°~ 180° (1° unit)

5.1.4 Radius of Corneal Curvature: 5.0 ~ 10.0mm (0.01mm unit)

5.1.5 Corneal Power: 33.00 m^{-1}~ 67.00 m^{-1} (in case that the corneal equivalent refractive power is 1.3375)

5.2 Other Performance Parameters

5.2.1 10.4″TFT touch screen (angle adjustable)

5.2.2 Printer: 57mm thermal printer, auto paper cutting

5.2.3Measuring Light Energy: ＜30uW (prevent injury to eyes during measuring)

5.2.4Electrical Power: AC100 ~ 250V, 50/60Hz

5.2.6Consumption: 60AV

5.2.7 N.W.: 24kgs

5.2.8 Dimensions: L451mm×W309mm×H502mm

5.2.9The refractometer service life for 10 years, to ensure accurate measurement, please make the metrological verification every year

5.3 Protection Level

5.3.1 Product Grade: Medical apparatus and instruments grade II

5.3.2 Electric Shock: Level I (ground)

5.3.3 Electric Shock Protection Class: Class B

5.4 Device Type

5.4.1 Anti Electric Shock Type: Class I

5.4.2 Anti Electric Shock Degree: Applicable type B

5.4.3 Non AP device, non APG device

5.4.4 Running Mode: Continuous duty

5.4.5 The equipment should not be used in the environment of flammable anesthetic gas.

6. ENVIRONMENT TERMS

6.1 Temperature: 10℃ ~ 30℃

6.2 Relative Humidity: (30~75) %RH

6.3 Atmospheric Pressure: 86kPa ~ 106kPa

6.4 Altitude: ＜2000m

6.5 No strong vibration and corrosive gas around

6.6 No strong electromagnetic interference around

6.7 Brightness: ＜150Lx

6.8 The device should be placed at the specified instrument table that can rise and fall vertically

7. LCD SCREEN DISPLAY (Figure 9)

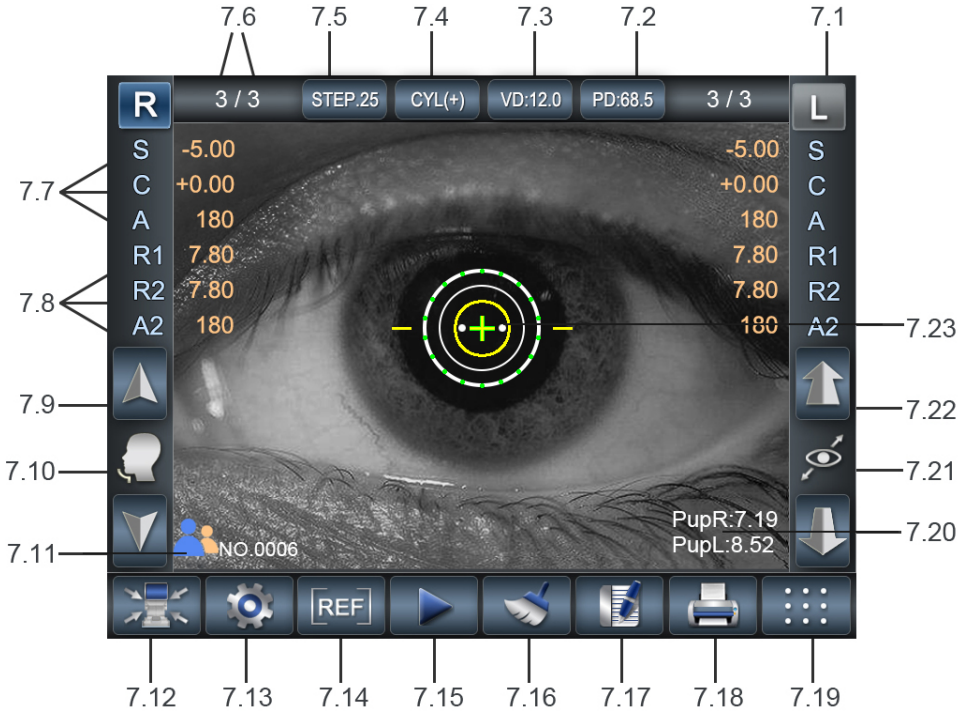


Figure 9

7.1 L/R Sign: Flashing sign indicates the current measured eye
7.2 Pupil distance display
7.3 VD selection (shortcut key)
7.4 Astigmatism symbol selection (shortcut key)
7.5 Step selection (shortcut key)
7.6 Times of refraction / corneal parameters measurement
7.7 Refractive parameters
7.8 Corneal value display
7.9 Chinrest up
7.10 Chinrest down
7.11 Adult//child mode selection
7.12 Head reset button
7.13 Set menu key
7.14 Measurement mode selection
7.15 Measurement start
7.16 Data clear key
7.17 Data record view
7.18 Measurement data printing button
7.19 Hartman lattice display
7.20 Left/right eye pupil diameter
7.21 Press the button far away from the measured head
7.22 press the button near the measured head
7.23 Pupil alignment target

8. MENU

8.1 setup menu

Touch the setting ( ) menu key to enter the setting submenu (the currently selected item is blue)

8.1.1 diopter setting (see Figure 10)

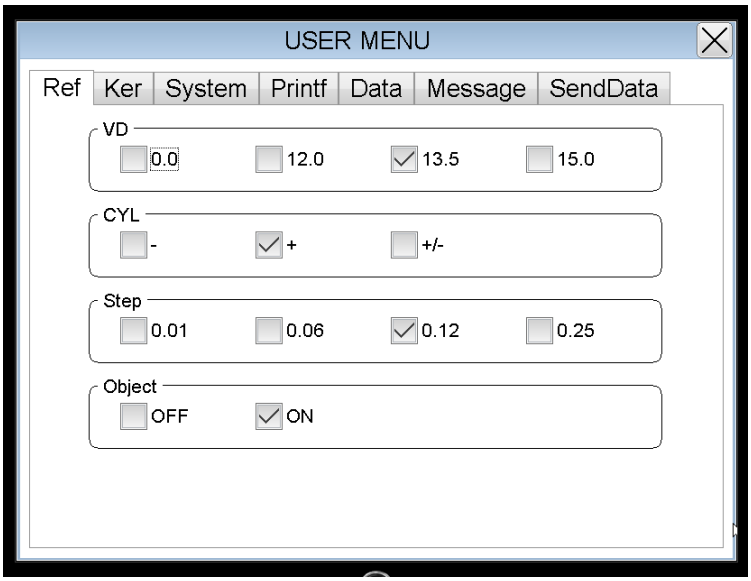


Figure 10

There are four options for diopter settings

VD: Distance between corneal and back top focus of lens, 0.0mm (contact lens), 12.0mm (Asian), 13.5mm (Middle East), 15.0mm (European)

CYL: Astigmatism symbol selection, －、＋、±(Mix)

STEP：Measurement data precision selection

FOGG: Visual guide target atomization function switch (position of guiding target atomization)

8.1.2 curvature setting (see Figure 11)

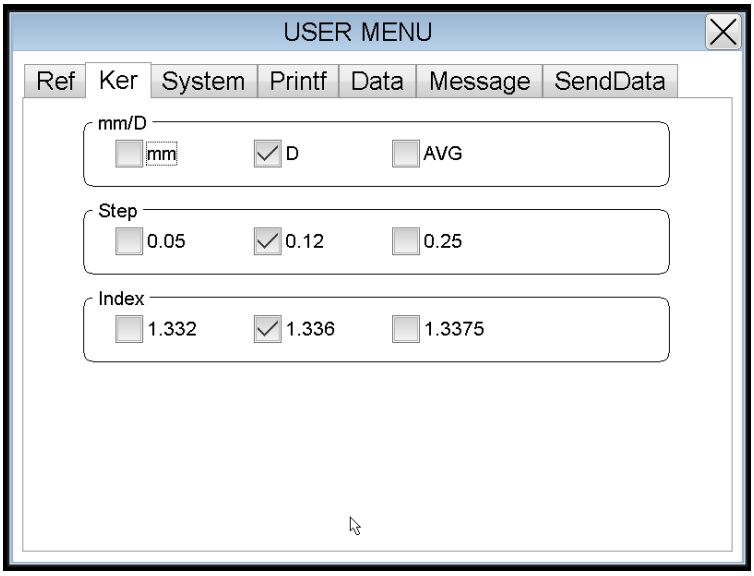


Figure 11

There are three options for the curvature setting

MODE：Keratometry radius measurement (mm), keratometry power measurement (D) and average value display (AVG) optional

STEP：Keratometry power precision display

REFRACTIVE INDEX：Factory defaults to 1.3375

8.1.3 mode setting (see Figure 12)

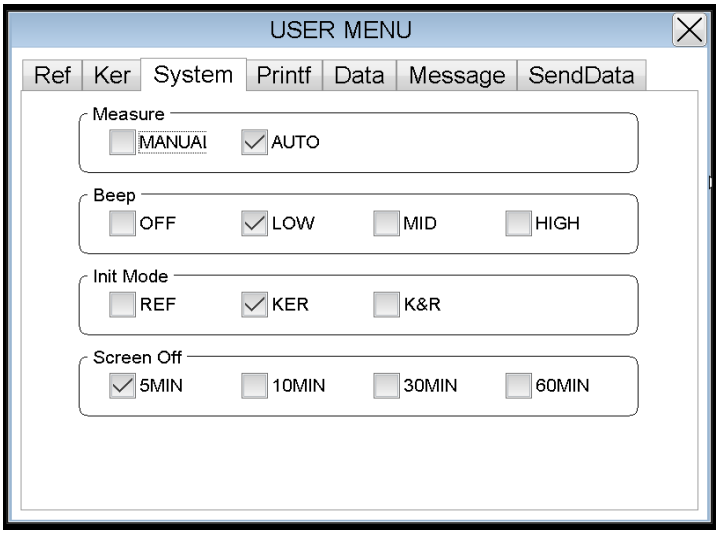


Figure 12

There are four options for the mode setting

MODE: Manual measurement mode and auto measurement mode optional (Auto measurement icon for grey said this model without this feature)

Buzzer: no sound when touching the button after closing

INT-M: Measurement mode selection (same as the main interface function), default start up mode for each starting

STAND BY: Instrument standby time setting (touch any key to wake up)

Brightness: LCD brightness setting

8.6.4 Printing setting and printing paper replacement (Figure 13)

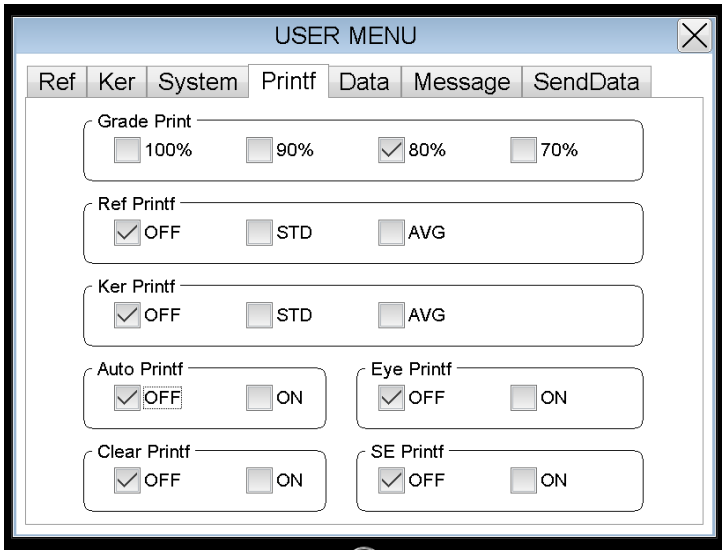


Figure 15

There are nine options for print settings

CONCENTRATION: Set the appropriate print concentration according to different thermal printing paper.

REFRACTOMETRY: When OFF selected, the refractometry power won't be printed out. When STD selected, all refractometry power will be printed out. When AVG selected, only print the average value of the refractometry power.

KERATOMETRY: When OFF selected, the keratometry power won't be printed out. When STD selected, all keratometry power will be printed out. When AVG selected, only print the average value of the keratometry power.

AUTO: When ON selected, the measurement results will be printed out automatically after the both eyes measurement finished (in this case, the data is cleared automatically) When OFF selected, press the print key on panel to print out the measurement results.

EYE: When ON or OFF selected, the refractometry state diagram will be printed or not.

Print clear: clear automatically after printing.

SE: When ON or OFF selected, SE data (the approximate value of cylinder power converted into sphere power) will be printed or not.

PUPIL: When ON or OFF selected, the pupil diameter will be printed or not.

SE: When ON or OFF selected, SE data (the approximate value of cylinder power converted into sphere power) will be printed or not.

How to install the printing paper

Press the print engine room panel button to open the print engine room, pull out the print paper head and close the printer door. (figures 14,15,16)

(figures 14)

(figures 15)

(figures 16)

8.1.5 Data setting (Figure 17)

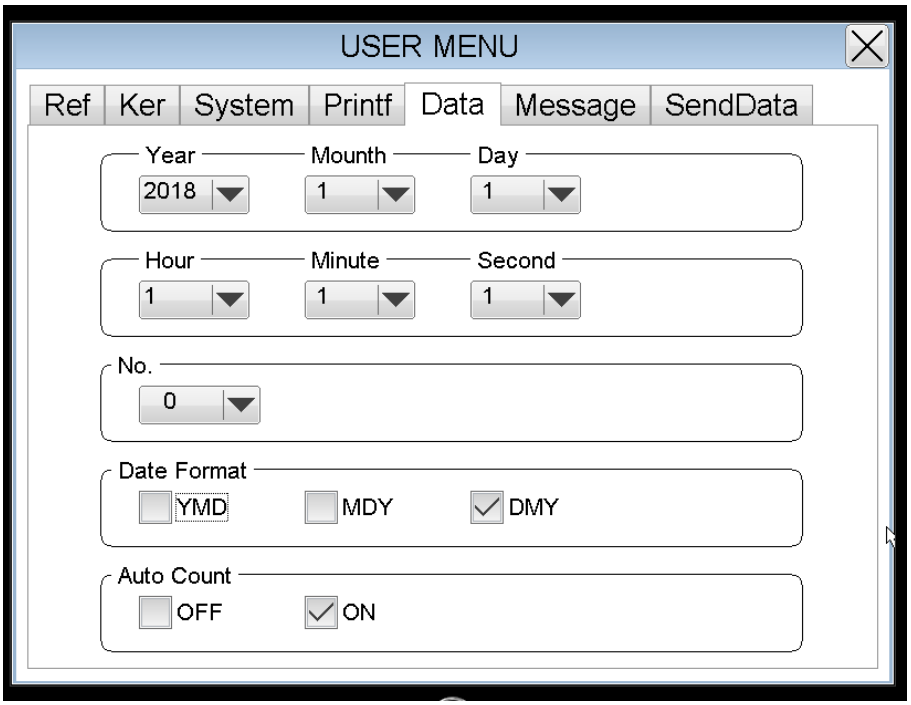


Figure 17

There are five options for data settings.

DISP: Date, month and year display mode

DATE: Edit or modify the exact time of date and month and year

TIME: Edit or modify the exact time of second and minute and hour

COUNT: When ON or OFF selected, recording the number of patients in main interface will be refreshed or not

No.: Patient number setting, patient measuring number setting

Touch DATE, TIME and NUMBER options, enter the sub menu as shown below, select the appropriate number.

8.1.6 Printing message setting (Figure 18)

MSG1 for company name or product model number setting

MSG2 for company address or brand name setting. Users can edit this information freely according to the exact requires. After setting, press ENTER key to preserve and quit.

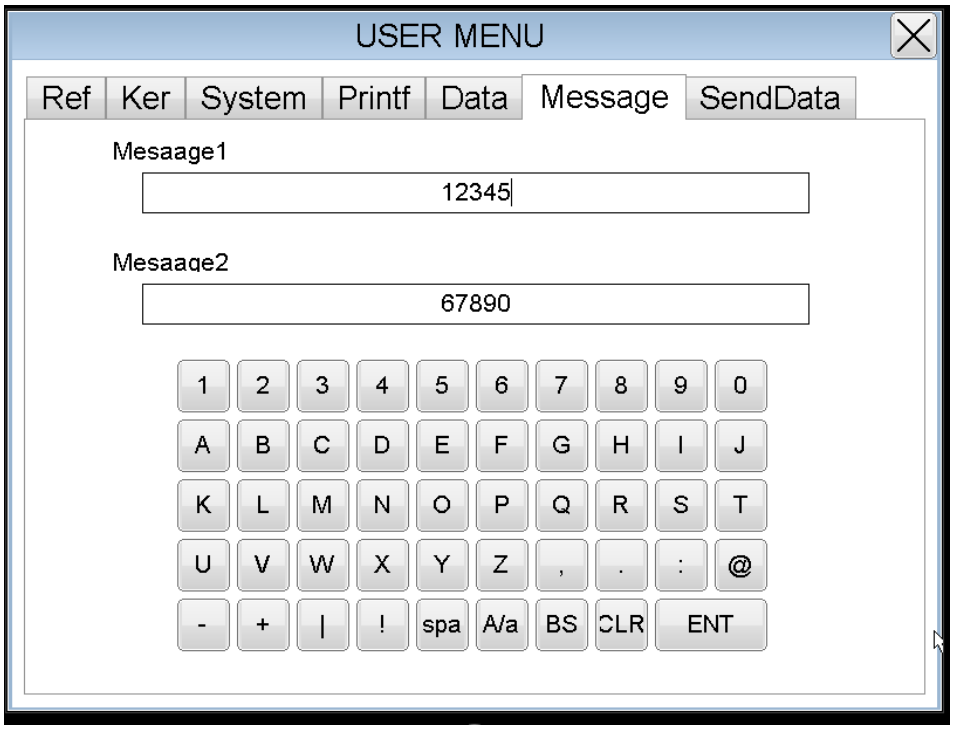


Figure 18

ENTER key for confirming and preserving

A/a for capital/small letter conversion

BS for deleting single letter

SPA key for space bar

CRL key for clearing all letters

8.1.7 Data transfer setting (Figure19)

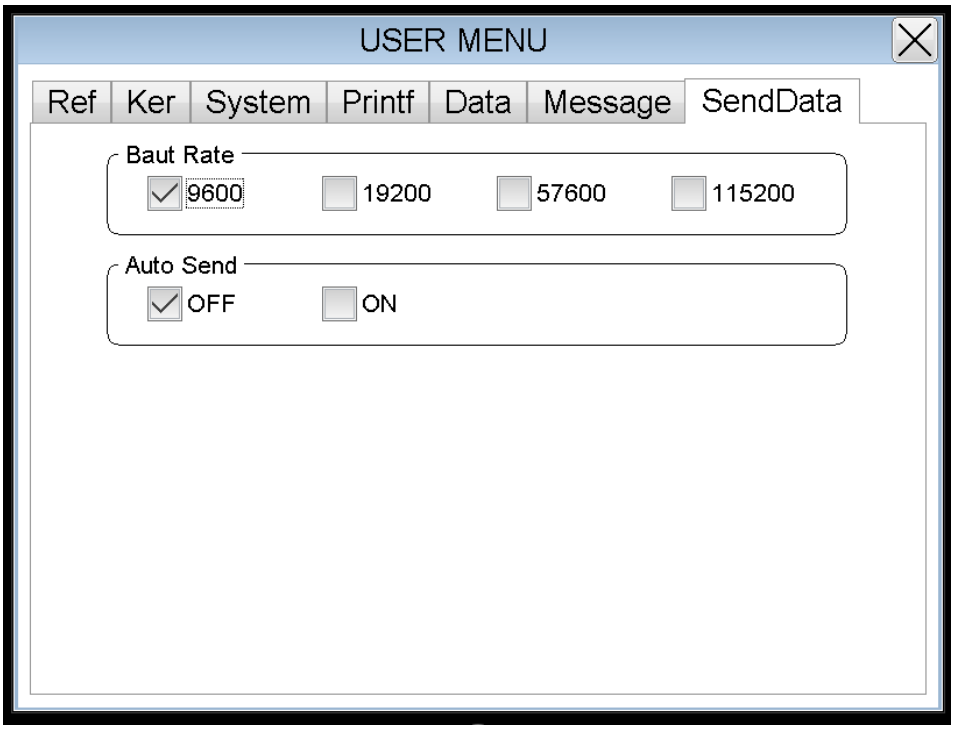


Figure19

According to the requires of the connected devices, customers choose the corresponding baud rate, and open the auto option, the measurement data will be automatically transferred to the connected devices, meanwhile the refractometer data will be automatically cleared.

8.2 Measurement Mode Selection

Touch this key to pop up three measurement mode menu (as shown in Figure 20), the user can choose to touch any measurement mode menu under need (KER for Keratometry mode, R/K for RefracKeratometry mode, REF for Refractometry mode)

Figure20

8.3Data Record Check

Touch () key to check the measurement data (directly print out the data, the measurement data won't be recorded)(Figure 21)

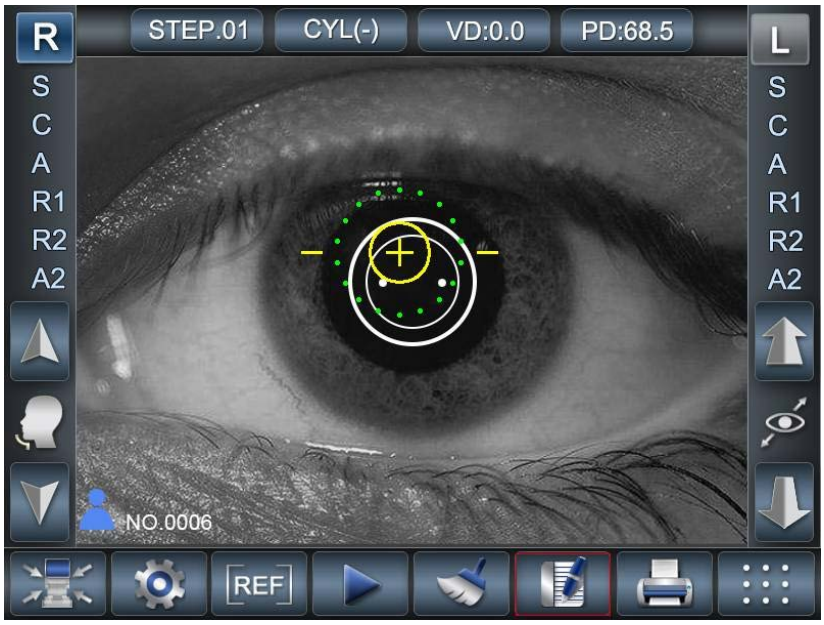


Figure21

Left/right eyes data can be recorded max.10 items separately. Touch REF to display the recorded refractometry data only, touch KER to display the recorded keratometry data only, touch CLEAR key to clear the recorded data, touch RETURN key to return to the measurement interface.

8.4Printing setting

Touch ( )key to print current measurement data。

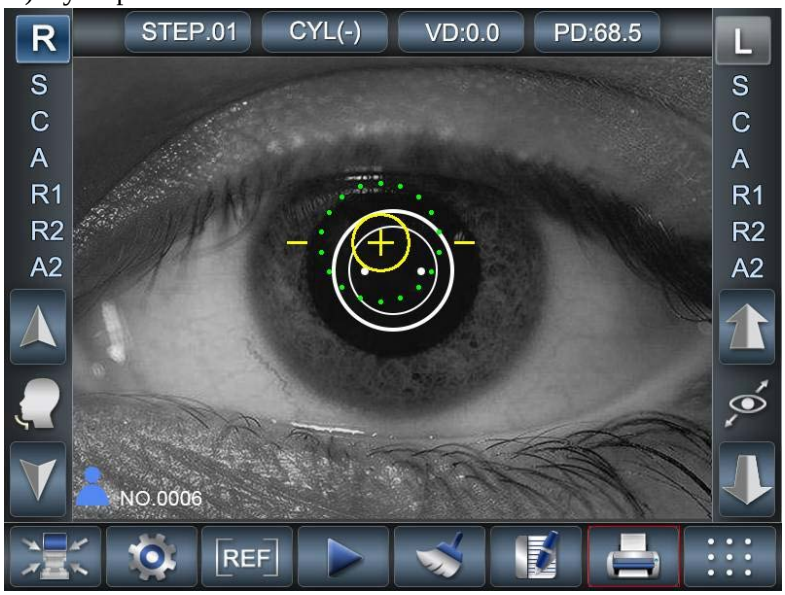


Figure22

8.5 Array display

Touch （ ） Key To Display The Patient's Fundus Array Distribution (Indirect Evaluation Of Fundus Imaging Quality).

Figure23

8.6 Shortcut Key

8.6.1 Step set: successively touch STEP key to quickly switch 0.01、0.06、0.12、0.25　8.9.2 CYL

8.6.2 axis set: successively touch CYL key to quickly switch —、+、±

8.6.3 VD set: successively touch VD key to quickly switch 0、12、13.5、15

9. MEASUREMENT

Suitable crowd and contraindication

Target patients for adults and children, and crowd of eye power range (-20 m-1 ~ +20 m-1). This product is not suitable for newborn eye measurement.

9.1 Preparations before Measurement

9.1.1 Place the device on the specified instrument table, loose the stage fixing lever and keep the device in free sliding state, adjust the four rubber feet to keep the device in horizontal.

9.1.2 Fix and install the specified chinrest paper and printing paper separately

9.1.3 Connect the spare power line to the instrument socket tightly (ensure the local voltage fit to the instrument specification)

9.1.4 Turn on the left side power switch (green indicator light show right in electricity connection), the instrument goes into self-check procedures. After self-check over, it automatically switches to main interface for measurement.

9.2 Notes for Operator and Patient

9.2.1 Adjust the chair height and screen angle in right position

9.2.2 Ensure the patient in comfortable and relaxed posture before measurement

9.2.3 By adjusting the instrument tabletop, keep the instrument height same to the patient natural sitting posture

9.2.4 Settle patient’s chin touch the chinrest front and forehead touch the rubber forehead rest in level (keep face parallel with the measurement window)

9.2.5 By observing the patient eyes position and height adjustment mark, press the chinrest up/down key on panel to adjust the patient’s eyes same height to the measurement window

9.2.6 By the operation lever, move the sliding body left and right to move the patient’s

eyes in the measurement range (if the distance of two sides asymmetrical,

adjust it by fixing the patient’s head deviation)(Figure24 25)

（figure24）

（figure25）

9.3 Measurement

Note 1: the measurement alignment mode of this instrument is that the corneal apex coincides with the central cross target

Note 2: manual mode is recommended for patients with blepharoptosis, eyelash interference,

cataract, small pupil, corneal lesion, corneal apex and pupil center mismatch.

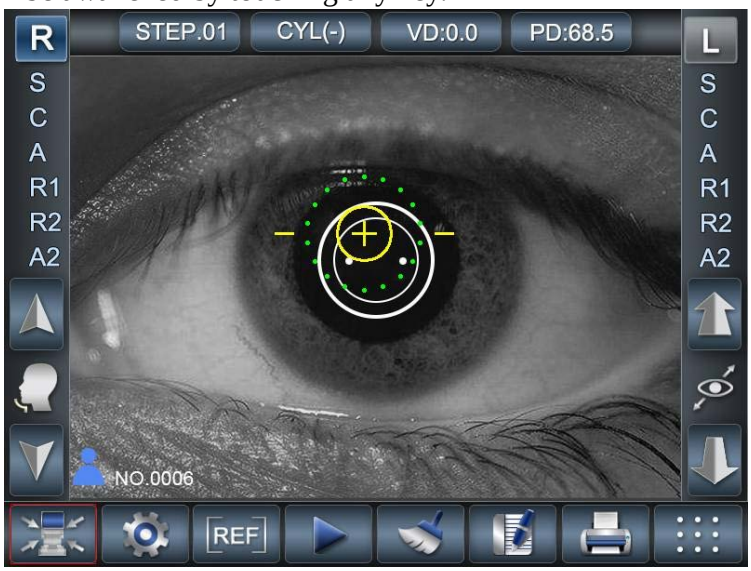
9.3.1 If the pupil is not in the screen area, the measurer can touch the four directions of the screen, move the measuring platform, display the pupil in the central area of the screen, and then press the button R、L of moving the measuring head back and forth to roughly align the position of the left and right eye orbits of the measured person The instrument can automatically track the pupil. After the measurement is completed, the machine automatically moves to the position of the other eye and automatically focuses the measurement.

After binocular measurement, the pupil distance will be automatically displayed in the corresponding position. Select whether to print the measurement results according to the settings (settings .After automatic printing or data transmission, the parameters on the display screen will be cleared automatically)

（Figure 26）

After the measurement, touch the reset key (see Figure 27) to move the measuring platform back to the original position, and touch the clear button to clear the measurement parameters.

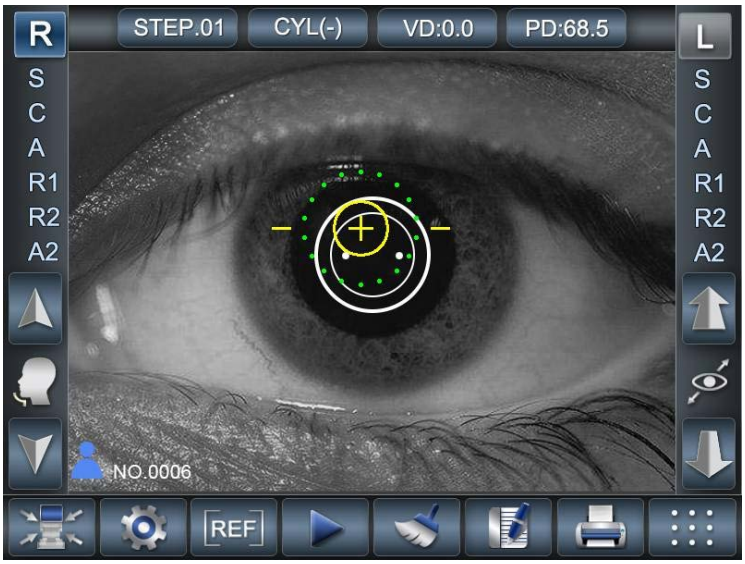
According to the set standby time, the instrument will enter the standby mode. The next measurement can be awakened by touching any key.



（Figure 27）

9.3.3 Child measurement mode

To measure children or the patients with pupil fibrillation, select child mode (Touch 7.9 key, the right small humanoid icon becomes green). （Figure 28）



（Figure 28）

9.3.4 Measurement error prompt

During measurement, if the patients found having eyelid ptosis, eyelash disturbance, cataract, microcoria, keratopathy, corneal vertex and pupil center noncoincidence, the error prompt will appear on screen when the instrument can’t measure normally, please select the manual measurement mode or force measurement mode (long press the measurement button).（Figure 29、30）

Figure 29

Figure 30

10. COMMON TROUBLE SHOOTING

10.1 Power indicator light not work

Check and confirm whether the local power fits to the instrument, whether the power plug loose, or whether the fuse damaged (in case this happen, please replace the same specified fuse)

10.2 Chinrest not lift

Check whether the chinrest lift to limit position

10.3 Printer can't work regularly

Check whether the printing paper is finished (in case this happen, red indicator light on panel will flash). Or whether the print setting is correct, and whether there is the measurement data (no data, not print)

10.4 Sliding body not flexible

Check whether the stage fixing lever placed at right position, or whether other sundries go into the slide slot

10.5 Press measurement button, but no data appear

Check whether the patient pupil smaller than 2mm, whether the eye position seriously incorrect, whether the cross measurement target aligns with the patient pupil (the target becomes thick and green), or whether the patient eyeground seriously deseased

10.6 Measurement light not work

When the measurement over, the measurement light will automatically turn off. Sway the sliding body, it will turn on automatically

10.7 If other problems appear, please contact the local agent or original manufacturer

- If the fault phenomenon listed in the common trouble shooting can't be resolved, please contact the original manufacturer or local agent to repair.
- Please provide us with the following information:

  Instrument name and model number

  Instrument serial number

  Fault phenomenon (detailed as possible)

(1.) Accessory maintenance limitation

Providing maintenance accessories to maintain the instrument functions during the instrument lifetime

(2.) Processing of instrument

- To be disposed carelessly of the instrument and accessories will pollute the environment
- Please contact the professional waste disposal company or local dealer before disposing this instrument

11. PACKAGING, TRANSPORTATION, STORAGE

Storage condition between -25℃ and +40℃, transportation condition between -40℃and 70℃, relative humidity between 30% and 75%, air pressure between 86kpa and 106kpa

(1.) Packing list, certificate and manual are included in the packing box

(2.) The product packaging is not allowed to be shipped with flammable, explosive, corrosive products. Loading should be neat, stable and firm, super high and overweight is not allowed. In transit, rain and snow prevention, anti sun, anti impact, drop prevention should be noted carefully.

(3.) The product packaging should be stored in a room temperature, dry and well ventilated warehouse, and can't be stored with chemical agents, acid and alkali substances, and other harmful substances.

12. ENVIRONMENTAL PROTECTION

The instruments that have be scrapped, should be strictly deposed in accordance with the requirements of local laws and regulations

13. ENCLOSURE ACCESSORIES

Number	Specification	Quantity
1	User's Manual	1
2	Dustproof Cover	1
3	Lens Dustproof Piston	1
4	Model Eye	1
5	Power Line	1
6	Chinrest Paper	1
7	Cleaning Cloth	1
8	Printing Paper	1
9	Fuse	2
10	Chinrest Pin	2